Veolia Australia & New Zealand

Woodlawn Bioreactor Expansion Project

Independent Odour Audit #10

October 2022

Final Report

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Project Number: N1806L.10

Report Revision		
Revision Number	**Date**	**Description**
0.1 Draft Report	30.07.2022	Draft report issued for internal review
1.0 Draft Report	25.10.2022	Draft report issued to the Client
1.0 Final Report	30.10.2022	Final report issued to the Client
1.1 Final Report	16.12.2022	Appendix A updated
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Report Title: Veolia Australia & New Zealand Woodlawn Bioreactor Expansion Project – Independent Odour Audit #10		

EXECUTIVE SUMMARY

In February 2022, Veolia Australia & New Zealand (**Veolia**) engaged The Odour Unit Pty Ltd (**TOU**) to carry out the tenth (10th) Independent Odour Audit (the **Audit**) of the Woodlawn Bioreactor Facility located at Collector Road, Tarago, New South Wales (the **Woodlawn Facility**).

Relevant Background and Context

In March 2010, Veolia issued an application to the New South Wales Department of Planning and Environment (**DPIE**) seeking approval to increase the maximum throughput rate of the Woodlawn Bioreactor from 500,000 to 1.13 million tonnes per annum (**tpa**). Simultaneously, Veolia was also seeking to increase the maximum throughput rate of the nearby Crisps Creek Intermodal Facility (**IMF**) to 1.18 million tpa.

Scope of Work

The specific scope of work for the Audit is detailed in *Condition 7* of *Schedule 4* of the *Specific Environmental Conditions - Landfill site* (DA 10_0012) and enforced by *Section 75J* of the *Environmental Planning and Assessment Act 1979* as part of the project approval for the Woodlawn Waste Expansion Project. As part of this project approval, Veolia is required to carry out an independent odour audit three (3) months from the date of project approval and annually thereafter, unless otherwise agreed by the Director-General.

Approach

The Audit consisted of the following key items, as required by the project approval for the Woodlawn Facility:

- **Fieldwork***:* the collection of odour samples from key sources (as per *Condition 7 (e)*), recording of relevant field observations, measurements, and discussions with Veolia personnel regarding the operations of the Woodlawn Facility, including the Bioreactor and IMF. The odour emissions inventory developed in previous independent odour audits (**IOAs**) was used as a basis for the sampling program in the Audit;

- **Reviewing***:* a comprehensive review of all new or updated documentation materialised since the previous 2020 IOA;

- **Modelling**: the undertaking of an update and re-run of the site-specific odour dispersion model for the Woodlawn Facility used as part of the project approval process; and

- **Reporting***:* a comprehensive summary of all aspects of the Audit, complying with the defined objectives of the Audit.

The additional work completed as part of the Audit included the following:

- Assess the operability and odour performance of the biofilter-based odour control system at the Mechanical Biological Treatment (**MBT**) Facility, with the objective of continuous improvement in odour mitigation and optimisation performance. Note: Operationally, the MBT Facility includes the receipt of solid waste from municipal, commercial, and industrial sources within the Sydney Metropolitan Area and operates under a separate environment protection licence (**EPL**) to the Bioreactor operations at the Woodlawn Facility. As of the previous 2020 IOA, the MBT Facility received consent to accept 20,000 tpa of Food Organics and Garden Organics (**FOGO**) as part of its existing approval that permits it to process up to 240,000 tpa of mixed waste and 40,000 tpa of garden waste. No change was required to the MBT Facility's infrastructure to enable FOGO material to be processed. All municipal solid waste (**MSW**) and FOGO streams are transported similarly to the Bioreactor via the IMF. The MSW and FOGO streams consist of different process flow through the MBT Facility;

- Completion of a field ambient odour assessment (**FAOA**) survey campaign during the Audit. The FAOA surveys were conducted before 0730 hrs and after 2100 hrs, as well as midday;

- Assessment of the odour potential for all the leachate evaporation dams, i.e., Evaporation Dam 3 North (**ED3N**) 1, ED3N2, ED3N3, ED3N4, Evaporation Dam 3 South (**ED3S**) 2 (formerly ED3S-S), and Evaporation Dam 1 (**ED1**) Coffer Dam;

- Collection of liquid samples of treated leachate stored in the evaporation lagoons for odour laboratory analysis prepared using the Liquid Odour Method (**LOM**);

- Re-run the Woodlawn Facility-specific odour dispersion model (as completed in the previous 2020 IOA) with the latest operational conditions and measured data obtained in the Audit. This includes the Woodlawn Bioreactor and MBT Facility;

- Assess and comment on the effectiveness of strategies developed to optimise landfill gas extraction and leachate management to minimise the fugitive gas/odour emission as outlined in the *Woodlawn Infrastructure Plan: 2020* (**WIP 2020**) and *NSW Woodlawn Bioreactor Infrastructure Plan - Section 5 Operational Management Program – Version 2022* (**WIPS5 2022**); and

- Review of the New South Wales Environment Protection Authority (**NSW EPA**) and other independent hydrogen sulphide (**H_2S**) ambient monitoring campaigns conducted in strategic locations in the Tarago region.

Audit Findings

Odour Emissions Inventory Key Outcomes - Bioreactor

Based on the quantifiable odour emission sources from the Bioreactor, the following key findings are made:

- The total measurable odour emission rate from the Woodlawn Facility found in the Audit was 37,700 ou.m^3/s, representing a moderate described since the 2020 IOA (91,100 ou.m^3/s). The dominant contributor to this result appears to be the increase in OER from ED3N Pond System;

- The active tipping face and waste covered areas are within normal trends for total measurable odour emissions from the Void and without consideration of fugitive landfill gas emissions;

- The Leachate Management System (**LMS**) continues to operate under low odour emission conditions and is unlikely to be contributing to any significant odour impact beyond the Woodlawn Facility boundary, despite the observed OERs for ED3N Pond System;

- From a comparative viewpoint, the specific odour emission rate (**SOER**) results show moderately close agreement between the Audit results and the original EA 2010 odour dispersion modelling study used in the *Odour and Dust Impact Assessment (Rev 5) Report* dated 2 August 2010 (**EA 2010**) value for all emission sources, apart from a single result for ED3N-1. This is a significant result as it shows that the **SOER** predictions in the EA 2010 continue to be suitable for current and future operations at the Woodlawn Facility. This is supported by the odour modelling analysis conducted in the Audit;

- Similar to previous IOAs, ED3N-2 & ED3N-3 have been reported both as separate emission sources and a single source (as per the EA 2010) to determine the relative contribution of odour emission from each pond; and

- ED1 Coffer Dam is included in the overall site emissions profile analysis and will form part of future IOAs.

In summary, the Audit odour testing results suggest that the Void continues to remain the major contributor to odour emissions at the Woodlawn Facility through fugitive gas emissions if landfill gas extraction is not effectively maintained. The fugitive landfill gas emissions that arise due to wall effects and cracks in the capping of waste, particularly near landfill gas extraction wells and Void perimeter and impacts of high rainfall events, are an on-going operational challenge at the Woodlawn Facility. As outlined in previous IOAs and a report titled *Leachate Assessment at Woodlawn Bioreactor* dated 3 August 2021 (the **Leachate Assessment**), the management of high rainfall events and its impact on the Bioreactor operations represent the current and dominant operational challenge from an odour management perspective at the Woodlawn Facility. As such, the Audit continues to support the development of a strategy and engineering design that focuses on reducing leachate generation by diverting and extracting stormwater. This is a more effective and achievable goal than increasing leachate extraction rates through the LMS, especially during high rainfall or frequent storm events. As also outlined in the Leachate Assessment, a leachate management strategy comprising high flow extraction of stormwater/slightly impacted stormwater, flexible leachate extraction rates, and maximising extractions during summer months for evaporation dams will be beneficial for managing leachate levels in the Bioreactor. Put simply, fugitive emission

pathways from the Void surface remain the current focus at the Woodlawn Facility from an odour management perspective.

Odour Emissions Inventory Key Outcomes – MBT Facility

Based on the quantifiable odour emission sources from the MBT Facility, the following key findings are made:

- The odour testing results for the Biofilter 1 System indicated a higher inlet odour emission rate compared to the previous 2020 IOA (27,000 ou.m^3/s to 83,300 ou.m^3/s). This is likely reflective of the operating conditions prevailing at the time. The biofilter outlet results were above the desirable performance target of 1,000 ou or less. At the time of sampling, Biofilter 1 System bed moisture and inlet relative humidity levels were low and further optimisation is required to improve performance. The effect of these operating circumstances has meant that the biofilter outlet emissions are higher than the desirable target or the outlet character continues to consist of the inlet character;

- The odour testing results for Biofilter 2 System indicated a significantly lower inlet odour emission rate compared to the previous 2020 IOA (231,000 ou.m^3/s to 25,600 ou.m^3/s). This is likely reflective of the operating conditions prevailing at the time. The Biofilter 2 System outlet results were below the desirable performance target of 1,000 ou and contained none of the inlet process character (garbage, compost) – this is a good outcome;

- The OERs are based on the measured inlet airflows to Biofilter System 1 and Biofilter System 2, i.e., 80,000 m^3/hr and 144,000 m^3/hr, respectively. These airflows are within the design airflow limit of 81,200 m^3/hr and 175,500 m^3/hr for Biofilter System 1 and Biofilter System 2, respectively; and

- The SOER range was between 0.15 – 0.3 ou.m^3/m^2.s and reflects the quality of the stockpile material sampled at the time (with a minor exception). This range is modestly comparable to the previous IOA and reflects the potential variability in the externally stored stockpile material at any given time.

FAOA Survey Findings

- Before 0730 hrs (on 21 March 2022):

    - **Bioreactor**: active tipping face (**ATF**) covered, tipping operations offline, mechanical evaporation operations offline, and LMS (including LTP and LTD) and landfill gas extraction online and operating under normal conditions; and

    - **MBT Facility**: no tipping in either the Reception Building or Organic Buffer Storage Building. The LAP is online and operating under normal conditions. All ingress and egress to process buildings are closed.

- Midday (on 22 March 2022):

- **Bioreactor**: ATF covered, tipping operations active, mechanical evaporation operations active, and LMS (including LTP and LTD) and landfill gas extraction online and operating under normal conditions; and

- **MBT Facility**: no tipping in either the Reception Building or Organic Buffer Storage Building. The LAP is online and operating under normal conditions. All ingress and egress to process buildings are being actively used.

- After 2100 hrs (on 22 March 2022):

  - **Bioreactor**: ATF covered, tipping operations offline, mechanical evaporation operations offline, and LMS (including LTP and LTD) and landfill gas extraction online and operating under normal conditions; and

  - **MBT Facility**: no tipping in either the Reception Building or Organic Buffer Storage Building. The LAP is online and operating under normal conditions. All ingress and egress to process buildings are closed.

The FAOA surveys identified odour that can be traced back to the Woodlawn Facility at modest distances in the Audit. The predominate odour types (Odour Character B, Odour Character C, and Odour Character D (i.e., 'sour, vomit (butyric acid), garbage', 'landfill gas, sulphurous', and 'sweet garbage, bin juice', respectively) that were detectable during the FAOA surveys under the prevailing operations were likely emanating from the Void surface and detectable at Very Weak (1) and Distinct (3) odour intensities. Based on the derived odour measurements and extensive experience gained by the Audit team of the Woodlawn Facility (and at other landfill operations), this odour is likely related to fugitive gas emission pathways originating from the surface of the Void, which is judged to be the major contributor to the risk of odour emission release from the Void.

The FAOA survey findings are inconsistent with the odour modelling predictions documented in the Audit. In view of the FAOA surveys and modelling analysis, it is likely that the sampled source areas found during the Audit were not adversely impacting nearby sensitive receptors to the Void and the Tarago Community. Instead, the observed impact found during the FAOA surveys is likely related to fugitive emission release from the Void surface. Furthermore, the pond-related sources, including ED3N Pond System, ED3S Pond System, Leachate Treatment Dam (**LTD**), Leachate Treatment Plant (**LTP**), ED1 Coffer Dam and the MBT Facility were not detectable to any significant extent. Notably, the FAOA survey findings continue to be consistent with and support the derived odour emissions results found in the Audit, which continue to show that all pond sources at the Woodlawn Facility are unlikely to lead to off-site impacts under the current treatment and storage conditions. To that end, the Audit supports Veolia continued strategies as documented in the WIP 2020 and WIPS5 2022 and previous audit recommendations promoting striving for operational excellence and continuous improvement in this area (particularly with respect to leachate and landfill gas extraction as well as stormwater diversion).

Modelling Analysis Findings

An odour dispersion modelling analysis of the Woodlawn Facility was completed as part of the Audit. This involved the modification of the previous IOA model to best represent the present operations during the Audit period, i.e., the calendar year 2021. Therefore, the odour emissions scenario used for the modelling was that observed during the Audit. This scenario represents TOU's best estimate of total odour emissions from normal operational conditions for the Woodlawn Facility but does not consider abnormal conditions or upset events.

Overall, the predicted cumulative impact has reduced significantly since the previous IOA. It has also been found that the leachate and MBT sources contribute the most to the odour profile of the Woodlawn Facility, attributable to the measured OERs and source type characteristics (large pond surface areas). The modelling has found that the ground level concentration at the nearest sensitive receptor (i.e., the Torokina property dwelling) is predicted to be well below the NSW EPA odour IAC of 6.0 ou (99%, P/M60). This appears to be incongruent with the professional experience and expert understanding by TOU of the Woodlawn Facility operations, field observations during the Audit, and findings of the FAOA Survey – this exemplifies the inherent uncertainty in using dispersion modelling to assess odour impact, particularly for complex operations and the geographic location of the Woodlawn Facility.

The Audit considers that compliance with the odour assessment criterion is one tool that provides an indication of acceptable odour impacts. The benchmark is if the emission of odour is offensive or is being prevented or minimised using best management practices and best available technology, with modelling used to comparatively evaluate different design or event scenarios. Therefore, the Audit considers that dispersion modelling may not be an appropriate tool to assess odour compliance or otherwise for the purpose of the defined objectives set in the Audit. Previous IOAs support this finding.

Modelling Analysis Concluding Remarks

The modelling outcome outlined in the Audit is consistent with the previous IOA findings, where compliance was deemed likely given that the majority of the SOER and corresponding OER results were within the ranges used in the EA 2010. However, it does not consider the unquantifiable impact associated with fugitive gas emission pathways and operational impacts on the Void operations from high rainfall events over the Audit period (assessed via the FAOA survey monitoring program conducted during the Audit). Furthermore, the Audit finds that Veolia continues to actively undertake measures to minimise odour emissions from the Woodlawn Facility, including participation in a community consultation process designed to provide the necessary odour impact feedback. This feedback will continue to be important in managing odour complaints/issues, particularly in view of the observed increased number of complaints over the Audit period. The Audit recommends that this continues in the future to determine compliance or otherwise with the project-specific goal.

Ambient H_2S Monitoring Campaign Findings

The Audit has reviewed the H_2S data that is publicly available on the NSW EPA website (https://www.epa.nsw.gov.au/working-together/community-engagement/updates-on-issues/odour-investigations/tarago-odours) and *Project Report – Investigation and Assessment of H_2S Gas emissions at the Woodlawn Bioreactor* dated 3 December 2021 (the **H_2S Study**). Based on the reported outcomes, the Audit considers that the event of detection and reported H_2S concentrations are very low and may have missed key odour events at the nominated receptor locations due to the limitation of the instrumentation (i.e., H_2S is the target odour and 10-minute purging period between measurements). Also, the effects of interference from vehicle combustion and other anthropogenic emission sources are not apparent or qualified in this dataset, given the very low concentrations of detection. As such, the lived experience by the community at the monitoring locations may not have been accurately represented if H_2S is adopted as the sole key marker for an odour event (noting that the odour characteristics detected in the FAOA survey in the Audit and previous IOAs are related to skatoles, indoles, volatile fatty acids, ketones, aldehydes, and reduced sulphur compounds, that are not readily amendable to continuous air quality monitoring). This sentiment appears to be supported by the frequency of logged complaints over the monitoring period, which has a higher frequency of occurrence compared with the frequency of detection by the H_2S instruments adopted in this monitoring program. The exception is the frequency of detection at Roseberry Street (9.9%), which may be considered significant if this data is further contextualised and qualified.

Odour Complaints Analysis and Response from Veolia

The odour complaints data logged by Veolia and associated response letters were reviewed and analysed in the Audit. Since the previous 2020 IOA, over the period of 1 April 2021 and 31 April 2022, there were 392 logged odour complaints, equivalent to a significant increase in logged complaints and the highest since the commencement of the IOA at the Woodlawn Facility. The data indicates that the autumn and winter period represent the highest incidence of logged complaints (representing 69% of the total logged odour complaints reported over the Audit period).

With the above in mind, despite the significant improvement in landfill gas extraction in the Void and expansion and improvement in the LMS through optimisation of surface water catchments, landfill gas infrastructure design, active tipping practices and increased leachate treatment capacity via the commissioning of the LTP, the odour complaints trend appear to reflect the operational challenges associated with the high rainfall conditions over the Audit period. Given the high volume of complaints and vast spatial variability in the nature of the complaint, there is a statistical challenge with conducting a multivariant analysis of this data. Instead, the key message from the complaints data is that there is strong community concern about odour from the Woodlawn Facility and the lived experienced is related to the number of complaints. The likely contributing factors to this increase in complaints are clearly identified in the Audit, minimising the value of such analysis being undertaken. However, an ambient air quality gas composition analysis should be conducted to better understand the local

airshed during unfavourable wind conditions. This has been included as a mandatory recommendation in the Audit.

Audit Recommendations

Based on the findings from this Audit, the following mandatory and non-mandatory measures have been recommended.

Mandatory Recommendations (MR)

The mandatory recommendations in this Audit revolve around the increase in the number of odour complaints, the LMS, the continuation of odour mitigation from the Void and the optimisation of the odour control infrastructure servicing the MBT Facility. The mandatory recommendations from the Audit are outlined below.

1. **MR1 - Odour Management Plan**

The preparation of a site-specific odour management plan for the Bioreactor and MBT operations that documents the following features as a minimum:

- Accepted waste streams and description of process operations;
- Standard operating procedures (**SOP**) that are employed in each key process area to anticipate the formation of emissions and minimise their potential impact on the local airshed (e.g., failure of pump equipment and/or high rainfall events);
- An outline of how the production and migration of emissions is minimised at the Woodlawn Facility, including design (where applicable) and operating practices;
- The monitoring and control protocols required to assist in the management of emissions;
- Critical odour emissions risk and control points;
- An outline of the key staff and responsibilities with respect to odour management; and
- An outline of the reporting requirements with respect to emissions present

Put simply, the sole purpose of the Odour Management Plan is to eliminate, prevent or minimise the potential release of adverse levels of air pollutants and odour at the Woodlawn Facility through a documented hierarchy of controls, in the form of, but not limited to, engineered, administration and/or management practices. The Odour Management Plan target will seek to find a practical balance between maintaining the quality of process operations designed to yield continuous improvement and operational excellence and the ability to control emissions to air. The Odour Management Plan will develop the link and/or consolidate of existing management plans and strategies with respect to odour from the Bioreactor and MBT Facility operations, as required.

2. MR2 - Odour Mitigation from the Void

Fugitive landfill gas emissions

As mentioned in the Audit, the high rainfall conditions over the assessed period have impacted the efficacy of gas emissions containment and capture, with fugitive emissions pathways anecdotally more prevalent than the previous IOA. This is supported by the increase in complaints and results of the FAOA surveys in the Audit (despite a 12% increase in landfill gas extraction since the previous IOA, predominately due to the installation and commissioning of the Flare 3 System). Therefore, Veolia should continue to manage fugitive landfill gas pathways from the surface using the existing toolkit, such as biocover material and perhaps research and trial novel techniques.

Furthermore, Veolia should also continue its mission of enhancing and accelerating its improvement to landfill gas capture from the Bioreactor as reasonably practicable. This continuation is apparent in the WIP 2020, which outlines a comprehensive plan that is being implemented to increase gas capture. The WIP 2020 also clearly seeks to address current areas of concern and the potential solution outcomes that can be implemented. This is an active (and effective) management approach that will continually improve gas capture efficiency and ultimately reduce odour/landfill gas emissions from the Void. It will also assist Veolia in navigating through the high incidence of high odour complaints and impacts from fugitive emissions from the Void surface. As such, the Audit endorses this strategy as the primary measure to reduce odour emissions from the Void and recommends that Veolia continues the implementation of the gas systems detailed in the WIP 2020 and WIPS5 2022, including:

- The augmentation of additional pipework and booster/flare/engine to the current capacity at the Woodlawn Facility. In principle, the addition of the power station engines will increase landfill gas usage capacity, further facilitate the optimisation and minimisation of fugitive landfill gas release from the Void surface;
- the planned infrastructure instalments within each waste lift;
- the continuous improvement of leachate extraction, treatment performance, capacity, and efficiency. This is supported by the implementation of the long-term leachate solution in the form of the LTP, which remains in the process-proving and optimisation phase of operation;
- the continuous improvement in the waste tipping profile, covering and expansion and optimisation of the landfill gas infrastructure;
- the continuous monitoring of leachate and gas extraction;
- remediation actions in the event of equipment failure and process upset in the Void;
- continuous awareness of condensate management;

- the implementation of operational management programs, including:
    - Leachate management;
    - Pumps and pumping solutions; and
    - The expansion of wells in the Void for improved/minimisation of leachate recirculation and landfill gas extraction.
- application of biocover material to manage fugitive landfill gas emissions, as outlined in the WIP 2020.

It should be noted that the WIP 2020 is a live document that is continually updated. Therefore, it will continue to remain a part of the IOA.

Management of High Rainfall Events

As outlined in previous IOAs and the Leachate Assessment, the management of high rainfall events and its impact on the Bioreactor operations represent a current operational challenge at the Woodlawn Facility. As such, the Audit continues to support the development of a strategy and engineering design that focuses on reducing leachate generation by diverting and extracting stormwater. This is a more effective and achievable goal compared with increasing leachate extraction rates through the LMS, especially during high rainfall or frequency storm events. As outlined in the Leachate Assessment, a leachate management strategy comprising high flow extraction of stormwater/slightly impacted stormwater, flexible leachate extraction rates, and maximising extractions during summer months for evaporation dams will be beneficial for managing leachate levels in the Bioreactor. Furthermore, given that ED1 Coffer Dam has approached 80% volume capacity, the acceleration of the progressive leachate management strategy is timely. The Audit agrees with the recommendations made in the Leachate Assessment to achieve this desired outcome, and they should be implemented as soon as practicable.

3. MR3 - Leachate Management System

Veolia should continue to adequately maintain, manage, and monitor the upgraded LMS to ensure it is operating in an optimum state and meeting the leachate quality monitoring targets as outlined in the *Leachate Treatment Operation Manual* and recommended by Veolia Water. Moreover, the performance goals outlined in the WIP 2020 should continue to be pursed and materialised. The minimum performance targets for the LMS should include the following:

- Maximising and optimising leachate extraction from the Bioreactor to meet the design treatment capacity and capability of the existing infrastructure;
- Minimising leachate generation by:
- Continuation of the existing stormwater diversion program at the Woodlawn Facility;

- For high rainfall events, develop acceptable limits for which contaminated but highly diluted stormwater can be rapidly diverted to stormwater storage, minimising leachate generation and pooling in the Void surface. The stormwater event should be designed with consideration of recent and atypical rainfall events brought about by La Niña and climatical impacts and contingency; and

- Develop and establish a simple and reliable monitoring and performance metric protocol that enables the capability of diverting diluted contaminated stormwater to one of the evaporation dams (i.e., ED3S1, ED3S2, or ED3N) or alternative contingency pond storage dedicated for contaminated stormwater. This will present an opportunity to further mitigate the potential adverse impacts on the landfill gas capture infrastructure and ultimately provide an improved odour outcome under such circumstances.

4. MR4 - Active Tipping Face

Veolia should continue to develop strategies for minimising the exposed active tipping face surface area. It should also proceed and continue with the details in the WIP 2020 and WIPS5 2022. The Audit notes that changes to the tipping profile to maximise stormwater capture and removal have increased the footprint area of the active tipping face. The target of leachate minimisation through stormwater diversion and management will have a larger material impact on odour compared to the minimisation of the active tipping area, given its impact on fugitive gas emission release and landfill gas capture. The Audit notes that Veolia notes that it is progressively moving to a tent shape from the current pyramid design (consistent with the outcomes of the Leachate Assessment). Following the completion of the tent profile, consideration will be given to an east-to-west slope to allow stormwater removal.

5. MR5 - Refine Investigation of Odour Issues in the Community

Given the significant increase in odour complaints documented in the Audit, the Audit recommends that Veolia continues with its community engagement and liaison process. This includes continued community engagement through various groups (i.e., Tarago and district Progress Association Inc (**TADPAI**), Tarago Times publications & Community Liaison Committee, Open days). Furthermore, given the limited efficacy of ambient H_2S monitoring with existing sensory technology, the Audit recommends calibration and training of Veolia staff in the undertaking of FAOA surveillance surveys to provide an additional tool in the TARP in place of the odour diary program. Veolia should also continue to log and monitor odour complaints in the current odour complaints register.

<u>Status of Odour Diaries</u>

It is understood that the reinstatement of the odour diary program occurred in February 2021. The Audit has reviewed the retrieved data from the collected diaries, and it is not considered a suitable community feedback tool in its current form to provide valuable data. As such, the odour diagram program should be discontinued unless participating community members are professionally trained on its use and data entry protocols.

Ambient Landfill Gas Composition Laboratory Analysis

Given the findings of the FAOA survey are incongruent with the dispersion modelling (predominately due to the unquantifiable nature of fugitive emission pathways within the Void surface), a landfill gas composition analysis should be completed to provide technical feedback on the gas analytes present of the landfill gas released to the ambient environment from uncontrolled gas emission release points from the surface of the Void at the Woodlawn Facility. The objective of the landfill gas composition analysis will be to identify the gas analytes present, with a focus on characterising those gas compounds that are known to be odorous, including but not limited to sulphur gases and volatile organic compounds. This data may facilitate in refining the ambient monitoring goals/targets, as the Audit does not consider, on the merit of technical evidence and operational experience, that the predominate or major issue in the community is solely attributable to H_2S from fugitive landfill gas emissions from the Void. This view is consistent with the sentiment extracted from the ambient data obtained in the H_2S Study as well as that completed by the odour monitoring program completed by the NSW EPA.

NSW EPA H_2S Monitoring Program Data Interpretation

To extract further meaning and facilitate in sound data interpretation, the H_2S data collected as part of the NSW EPA monitoring program will need to be contextualised with prevailing wind conditions, date and time of detection between different locations, and correlated with landfill gas extraction and leachate extraction rates to facilitate in the interpretation of this data. Furthermore, consideration to other potential sources of H_2S that may cause interferences from the local environment needs to be considered to improve confidence in the data and evaluate if H_2S as a tracer gas for odour emissions from the Woodlawn Facility can be relied upon as a sole parameter. This will be completed as part of a separate study to the Audit and before the next IOA.

6. MR6 - Odour Mitigation from the MBT Facility

The Audit recommends a heightened awareness of the operability and maintenance of the biofilter-based odour control system at the MBT Facility, which should be consistent with the Biofilter Manual to ensure optimal and sustained odour removal performance. It is recommended that the MBT Facility improve its overall management of biofilter bed moisture to ensure optimum odour removal performance. This can be achieved by an intensification of the surface drip irrigation system and/or optimisation of the current spray humidification system. Based on the physical and odour measurement data obtained during the Audit, the requirement for a biofilter refurbishment should be considered within the next 12 months or earlier. A biofilter condition and performance assessment can be completed to support the case for a refurbishment if required.

The LAP should also be improved for further optimise leachate quality within the LAP system at the MBT Facility.

Non-Mandatory Recommendation (NMR)

The non-mandatory recommendations in this Audit revolve around odour mitigation strategies for the Void, odour complaints, and fugitive gas emissions from the Void only. The non-mandatory recommendation from the Audit is outlined below.

1. NMR 1 - IMF and Waste Transport Activities

Based on TOU observations, the Audit suggests that Veolia continue to review the following aspects relating to the use of the IMF and waste transport activities to further improve its odour performance as a minor and transient source of odour, namely:

- The washing practice associated with the sealed containers; and
- The maintenance of the sealed containers.

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LIST OF ABBREVIATIONS & DEFINITION

2021 Recommended Responses	*Woodlawn Eco-precinct Independent Odour Audit (IOA) 2021 Recommended Responses*, Veolia Environmental Services, 2021
AQGGMP	Air Quality and Greenhouse Gas Management Plan for Woodlawn Bioreactor Document Code: PLA-NSW-XXX-XXX-1 dated 24.07.2018
AS/NZS 4323.3	Australian/New Zealand Standard 4323.3: 2001: *Determination of odour concentration by dynamic olfactometry*
AS/NZS 4323.4	Australian/New Zealand Standard 4323.4:2009. *Stationary source emissions - Area source sampling - Flux chamber technique.*
ATF	Alterative Treatment Facility
BOM	Bureau of Meteorology
BRS	Biological Refining System
BWMS	Bioreactor Waste Management System
C & D	construction & demolition
COD	chemical oxygen demand
DEM-S	Derived Smoothed Digital Elevation Model
DPIE	New South Wales Department of Planning and Environment
EA 2010	Environmental Assessment Woodlawn Expansion Report (August 2010)
ED1	Evaporation Dam 1
ED3N	Evaporation Dam 3 North
ED3S	Evaporation Dam 3 South
EPL	Environment Protection License
FAOA	field ambient odour assessment
FOGO	Food Organics and Garden Organics
HRT	hydraulic retention time

IAC	impact assessment criterion
IFH	Isolation Flux Hood
IMF	Crisps Creek Intermodal Facility
IOA	Independent Odour Audit
KOPs	knock-out pots
LAP	Leachate Aeration Pond
LMS	Leachate Management System
LOM	Liquid Odour Method
LTD	Leachate Treatment Dam
LTP	Leachate Treatment Plant
MBR	Membrane Bioreactor
MBT	Mechanical Biological Treatment
MLP	Measurement Location Point
mm	millimetres
MSW	municipal solid waste
MW	megawatts
MWOO	mixed waste organic material
NATA	National Association of Testing Authorities
NSW EPA	New South Wales Environment Protection Authority
OER	odour emission rate
PTFE	polytetrafluoroethylene
RH	relative humidity
RL	reduced level
SCADA	supervisory control and data acquisition
SOER	specific odour emission rate
SRTM	Shuttle Radar Topography Mission

TADPAI	Tarago and district Progress Association Inc
TARP	Trigger Action Response Plan
the 2021 Emissions Testing Report	Emission Testing Report Veolia Environmental Services (Australia) Pty Ltd Woodlawn Biogas Power Station, Tarago: R010872 – 19 November 2021
the 2022 Emissions Testing Report	Emission Testing Report Veolia Environmental Services (Australia) Pty Ltd Woodlawn Biogas Power Station, Tarago: R011837[DRAFT] – 7 February 2022
the Audit	2021 Independent Odour Audit
the Biofilter Manual	*The Biofilter System Operating & Maintenance Manual – Revision 0* dated November 2016
the Biofilter Trial Report	Report for the biofiltration trial at Woodlawn Bioreactor dated March 2017
the December 2020 ADC Report	*Veolia Environmental Services (Australia) Pty Ltd - Alternative Daily Cover – Odour Trial Study: December 2020 – Final Report*, 16 December 2020
the Evaporator Manual	Veolia Woodlawn Bioreactor Evaporation System Operation Manual dated August 2021
the H_2S Study	*Project Report – Investigation and Assessment of H2S Gas emissions at the Woodlawn Bioreactor* dated 3 December 2021
the Landfill Guideline	NSW EPA, Environmental Guidelines: Solid Waste Landfills dated 2016
the Leachate Assessment	*Leachate Assessment at Woodlawn Bioreactor*, Earth2Water, 3 August 2021
the LMS May 2016 Report	*Woodlawn Bioreactor Facility Odour Modelling Study - Proposed Addition of ED3S to Leachate Management System* dated May 2016 Report
The MBT OEMP	Veolia Operational Environmental Management Plan – Woodlawn Mechanical Biological Treatment Facility dated March 2022

the NSW EPA Approved Methods	NSW EPA document titled *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* dated January 2022
the NSW EPA Odour Guide	NSW EPA, *Guide to conducting field odour surveys* dated June 2022
the Previous Model	The original EA 2010 odour dispersion modelling study used in the *Odour and Dust Impact Assessment (Rev 5)* Report dated 2 August 2010
the Woodlawn Facility	Woodlawn Bioreactor Facility, Collector Road, Tarago, NSW
TOU	The Odour Unit Pty Ltd
tpa	tonnes per annum
TWL	Top Water Level
US EPA	United States Environment Protection Agency
USGS	United States Geological Survey
VENM	Virgin Excavated Natural Material
Veolia	Veolia Australia & New Zealand
WALTER	Woodlawn Aerated Leachate Treated Effluent Refiner
WCA	Waste Covered Area
WIP 2020	Woodlawn Infrastructure Plan: 2020
WPIS5 2022	NSW Woodlawn Bioreactor Infrastructure Plan - Section 5 Operational Management Program – Version 2022

CHEMICAL NOMENCLATURE

CH_4	methane
CO_2	carbon dioxide
$Fe_2(SO_4)_3$	ferric sulphate
GIS	Geographic Information System
H_2S	hydrogen sulphide

H_2SO_4	sulphuric acid
N_2	nitrogen gas
NOx	nitrogen oxides
SO_3	sulphur trioxide

UNITS OF MEASUREMENTS

µL	microlitres
ha	hectare
km	kilometres
kW	kilowatts
L	litres
L/day	litres per day
L/min	litres per minute
L/s	litres per second
m	metres
m/s	metres per second
m^2	square metres
m^3	cubic metres
ou	odour concentration
ou.m^3/m^2.s	specific odour emission rate
ou.m^3/s	odour emission rate
Pa	Pascals
ppm	parts per million, by volume
ppb	parts per billion, by volume
RH	relative humidity

1 INTRODUCTION

In February 2022, Veolia Australia & New Zealand (**Veolia**) engaged The Odour Unit Pty Ltd (**TOU**) to carry out the tenth (10th) Independent Odour Audit (the **Audit**) of the Woodlawn Bioreactor Facility located at Collector Road, Tarago, New South Wales (the **Woodlawn Facility**).

1.1 WOODLAWN WASTE EXPANSION PROJECT BACKGROUND AND CONTEXT

In March 2010, Veolia issued an application to the New South Wales Department of Planning and Environment (**DPIE**) seeking approval to increase the maximum throughput rate of the Woodlawn Bioreactor from 500,000 to 1.13 million tonnes per annum (**tpa**). Simultaneously, Veolia was also seeking to increase the maximum throughput rate of the nearby Crisps Creek Intermodal Facility (**IMF**) to 1.18 million tpa. In addition to these items, the proposal application entailed:

- Installing additional lighting at the Woodlawn Facility;
- Extending the approved hours of operation at the Bioreactor and the IMF;
- Increasing the number of truck movements transporting waste to the Bioreactor from the IMF; and
- Increasing the amount of waste transported to the Woodlawn Facility by road from regional councils from 50,000 to 130,000 tpa.

Veolia received approval for the Woodlawn Waste Expansion Project on 16 March 2012.

1.2 AUDIT OBJECTIVES

The specific scope of work for the Audit is detailed in *Condition 7* of *Schedule 4* of the *Specific Environmental Conditions - Landfill site* (DA 10_0012) and enforced by *Section 75J* of the *Environmental Planning and Assessment Act 1979* as part of the project approval for the Woodlawn Waste Expansion Project. As part of this project approval, Veolia is required to carry out an independent odour audit three (3) months from the date of project approval and annually thereafter, unless otherwise agreed by the Director-General. The Audit must:

a. *Consult with the Environment Protection Authority and the Department of Planning, Industry and Environment;*

b. *Audit the effectiveness of the odour controls on-site in regard to protecting receivers against offensive odour;*

c. *Review the Proponent's production data (that are relevant to the odour audit) and complaint records;*

d. *Review the relevant odour sections of the Air Quality and Greenhouse Gas Management Plan for the project and assess the effectiveness of the odour controls;*

e. *Measure all key odour sources on-site, including:*

   i. *consideration of wet weather conditions providing all raw data used in this analysis;*

   ii. *consideration of (but not limited to) all liquid storage area, active tipping faces, waste cover area, aged waste areas and recirculation of leachate into waste in the void; and*

   iii. *a comparison of the results of these measurements against the predictions in the Environment Assessment.*

f. *Determine whether the project is complying with the requirements in this approval to protect receivers against offensive odour;*

g. *Outline all reasonable and feasible measures (including cost/benefit analysis, if required) that may be required to improve odour control at the Woodlawn Facility; and*

h. *Recommend and prioritise (mandatory and non-mandatory) recommendations for their implementation.*

In addition to the above, *Condition 9* of *Schedule 5* under DA 10_0012 requires the Audit to "…*include consideration of the Crisps Creek IMF site in any Independent Odour Audit required by Condition 7 in Schedule 4*." This is included as part of the Audit. To that end, the following document is the tenth (10th) Independent Odour Audit (**IOA**) commissioned since the Woodlawn Waste Expansion project approval was granted.

1.3 COMPLIANCE WITH AUDIT OBJECTIVES

The Audit consisted of the following key items, as required by the project approval for the Woodlawn Facility:

- **Fieldwork***:* the collection of odour samples from key sources (as per *Condition 7 (e)*), recording of relevant field observations, measurements, and discussions with Veolia personnel regarding the operations of the Woodlawn Facility, including the Bioreactor and IMF. The odour emissions inventory developed in previous IOAs was used as a basis for the sampling program in the Audit;

- **Reviewing***:* a comprehensive review of all new or updated documentation materialised since the previous 2020 IOA. For the Audit, this review included the following documentation:

  - Landfill gas capture and trend since the previous IOA;

  - The status of the long-term leachate management solution via the construction and commissioning of a Leachate Treatment Plant (**LTP**);

  - Leachate quality data for the Leachate Management System;

- Surface gas monitoring results between April 2021 and March 2022;
- Record of received waste tonnage per month;
- Odour complaints register and responses by Veolia since the previous IOA;
- Air Quality and Greenhouse Gas Management Plan for Woodlawn Bioreactor Document Code: PLA-NSW-XXX-XXX-1 dated 24.07.2018 (**AQGGMP**);
- Emission Testing Report Veolia Environmental Services (Australia) Pty Ltd Woodlawn Biogas Power Station, Tarago: R011837[DRAFT] – 7 February 2022 (the **2022 Emissions Testing Report**) and Emission Testing Report Veolia Environmental Services (Australia) Pty Ltd Woodlawn Biogas Power Station, Tarago: R010872 – 19 November 2021 (the **2021 Emissions Testing Report**);
- Veolia Woodlawn Bioreactor Evaporation System Operation Manual dated August 2021 (the **Evaporator Manual**);
- *The MBT Facility Biofilter System Operating & Maintenance Manual – Revision 0,* dated November 2016 (the **Biofilter Manual**);
- Operational Environmental Management Plan – Woodlawn Mechanical Biological Treatment Facility dated March 2022 (the **MBT OEMP**);
- *Woodlawn Eco-precinct Independent Odour Audit (IOA) 2021 Recommended Responses*, Veolia Environmental Services, 2021 (the **2021 Recommended Responses**);
- *Leachate Assessment at Woodlawn Bioreactor* dated 3 August 2021 (the **Leachate Assessment**);
- *Project Report – Investigation and Assessment of H2S Gas emissions at the Woodlawn Bioreactor* dated 3 December 2021 (the **H_2S Study**);
- Waste Infrastructure Plan – 13 October 2020 (**WIP 2020**); and
- NSW Woodlawn Bioreactor Infrastructure Plan - *Section 5 Operational Management Program* – Version 2022 (**WIPS5 2022**).

- **Modelling**: the undertaking of an update and re-run of the site-specific odour dispersion model for the Woodlawn Facility used as part of the project approval process; and
- **Reporting***:* a comprehensive summary of all aspects of the Audit, complying with the objectives specified in **Section 1.2**.

The WIP 2020, WIPS5 2022, and the Biofilter Manual are commercial-in-confidence documents that have been utilised by TOU under privilege to assist with the undertaking of the Audit. All relevant information has been extracted and reproduced as required in the Audit. Where documentation is not included in the Appendices of the main report for the Audit, it can be retrieved with permission and upon request.

1.3.1 Consultation with DPIE and NSW EPA

As required in *Condition 7 (A)* of the project approval, TOU initiated a consultation process with both the New South Wales Environment Protection Authority (**NSW EPA**) and the DPIE on 24 February 2022 via email correspondence. A copy of the electronic correspondence issued to the NSW EPA and DPIE and related responses are appended as **Appendix A**.

1.3.2 Additional Work to Audit requirements

In addition to the project approval requirements specified in **Section 1.2**, the following work components were included in the Audit:

- Assess the operability and odour performance of the biofilter-based odour control system at the Mechanical Biological Treatment (**MBT**) Facility, with the objective of continuous improvement in odour mitigation and optimisation performance;
- Completion of a field ambient odour assessment (**FAOA**) survey during the Odour Audit. The FAOA surveys were conducted before 0730 hrs and after 2100 hrs, as well as midday;
- Assessment of the odour potential for all the leachate evaporation dams, i.e., Evaporation Dam 3 North (**ED3N**) 1, ED3N2, ED3N3, ED3N4, Evaporation Dam 3 South (**ED3S**) 2 (formerly ED3S-S), and Evaporation Dam 1 (**ED1**) Coffer Dam;
- Collection of liquid samples of treated leachate stored in the evaporation lagoons for odour laboratory analysis prepared using the Liquid Odour Method (**LOM**) as described in **Section 4.3**;
- Re-run of the Woodlawn Facility-specific odour dispersion model (as completed in the previous 2020 IOA) with the latest operational conditions and measured data as obtained in the Audit. This includes the Woodlawn Bioreactor and MBT Facility;
- Assess and comment on the effectiveness of strategies developed to optimise landfill gas extraction and leachate management to minimise the fugitive gas/odour emission as outlined in the WIP 2020 and WIPS5 2022; and
- Review of NSW EPA hydrogen sulphide (**H_2S**) ambient monitoring campaign conducted in strategic locations in the Tarago region.

The following report summarises the outcomes of the Audit carried out at the Woodlawn Facility.

2 THE WOODLAWN FACILITY

2.1 WOODLAWN BIOREACTOR FACILITY BACKGROUND

The Woodlawn Facility is located 250 kilometres (**km**) south of Sydney, within the 6,000 hectares (**ha**) Woodlawn Eco-Precinct, in the Southern Tablelands near Goulburn in New South Wales. An aerial view of the Woodlawn Facility, highlighting the key areas as they currently stand, is shown in **Figure 2.1**.

Prior to waste operations, the Woodlawn Facility operated as a base metals open-cut mine site during the 1970s and 1990s, processing copper, lead, and zinc. Since September 2004, the mine void has been operated as an in-situ Bioreactor, historically receiving putrescible waste solely from the Sydney metropolitan area via the Clyde Transfer Terminal Facility. Since early 2012, receival of waste from local regional areas had commenced.

Waste received and contained within the Bioreactor undergoes anaerobic decomposition resulting in the production of landfill gas. The landfill gas, predominately rich in methane (**CH_4**) and carbon dioxide (**CO_2**), is continuously extracted from the Bioreactor and directly processed via purpose-built landfill gas-fired engines that form the Woodlawn Facility's power plant. Each landfill gas-fired engine can generate up to 1.065 Megawatts (**MW**) of 'green' electricity. All electricity generated is exported to the main grid. The Bioreactor process is described in further detail in **Section 2.2**.

Aside from generating electricity from waste at the Woodlawn Facility, Veolia is also undertaking mine rehabilitation works and has established aquaculture and horticulture projects within the Eco-Precinct. In early-October 2018, Veolia had also commenced operation of its long-term leachate management solution via the commissioning and optimisation of the LTP at the Woodlawn Facility, which falls under a separate development consent and environment protection licence (**EPL**) - at the time of the Audit, this continues to be in the process-proving stage to optimise extraction and treatment capacity of the LTP. The Audit has provided commentary on the implication of the LTP in the context of leachate management and odour emissions (refer to **Section 2.4.6** and **Section 9.2.1.1**). The existing leachate treatment dam (**LTD**) is still operating concurrently with the LTP, providing on-going leachate treatment capacity for the Bioreactor operations at the Woodlawn Facility.

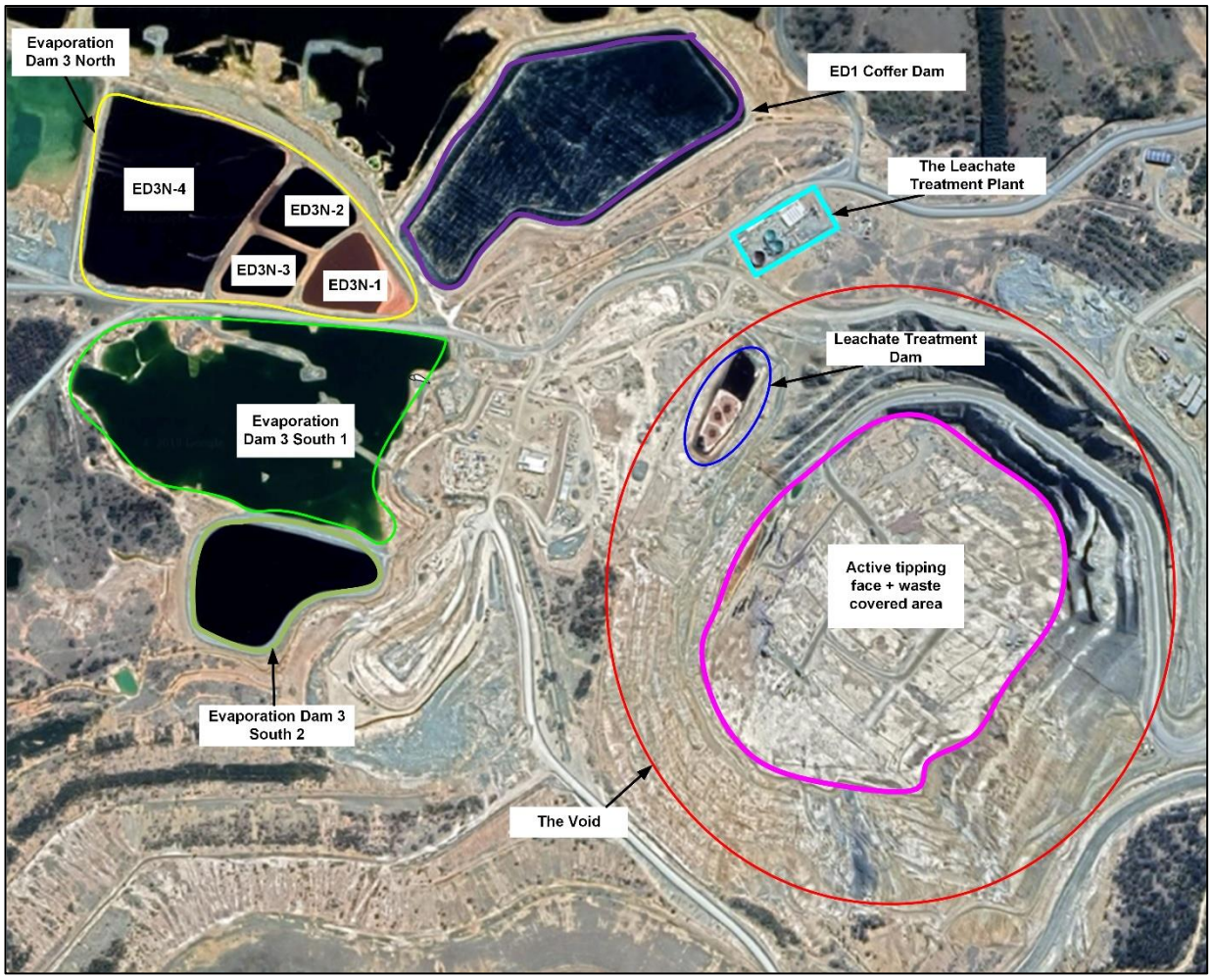


Figure 2.1 – An aerial view illustrating the layout of the Woodlawn Facility as of the Audit (**Map source:** Google Earth®)

2.2 PROCESS OVERVIEW

The Woodlawn Facility has the approval to operate between 0600 hrs to 2200 hrs on Mondays to Saturdays, with no activities on Sundays, Good Friday, or Christmas Day. For the Audit, the operational processes at the Woodlawn Facility have been categorised under two primary management systems, namely:

1. The Bioreactor Waste Management System (**BWMS**); and

2. The Leachate Management System (**LMS**).

The above management systems are described in concise detail in **Section 2.3** & **Section 2.4**, respectively. Further details regarding these systems are contained in the *Environmental Assessment Woodlawn Expansion Report* dated August 2010 (**EA 2010**).

2.3 BIOREACTOR WASTE MANAGEMENT SYSTEM

The Bioreactor surface layout consists of the following key features:

- An active tipping face (**ATF**);

- Waste covered areas, including daily cover, intermediate cover, and biocover;
- A mobile tipping platform;
- Leachate extraction, transfer, and reinjection via the LMS. The reinjection feature of the LMS is very rarely used, but the extraction and transfer are actively utilised (refer to **Section 2.3.2**);
- Stormwater management; and
- A gas extraction system.

For the effective operation of the Bioreactor, there is a complex network of infrastructure, operational procedures, and management protocols to streamline tipping, covers, capping, in-situ install of equipment, landfill gas extraction, leachate transfer and extraction, and stormwater diversion. A consequence of this operational complexity and strongly interconnected infrastructure is a constantly evolving and dynamic Bioreactor layout that varies temporally, spatially, and operationally. With this in mind, the infrastructure and operational management of the Bioreactor at the Woodlawn Facility consist of the following key features:

- the requirement of covering areas of waste;
- the timing and necessary provisions for a given waste lift;
- the landfill gas collection system, including:
    - the strategic placement and maintenance of the vertical landfill gas extraction wells gridded system;
    - landfill gas collection pipe network;
    - condensate management and the leachate removal system; and
    - individual gas wells in the waste to manage high-risk areas prone to the release of fugitive landfill gas emissions from the surface of the Void;
- setup of the leachate extraction and recirculation system;
- stormwater management in the Void, including catchment management and stormwater captured within the Void perimeter; and
- application of biocover material to manage fugitive landfill gas emissions, as outlined in the WIP 2020 and WIPS5 2022 (refer to **Section 10.2.1** for further details).

The Void layout and operations prevalent at the time of the Audit are shown in **Figure 2.2**.

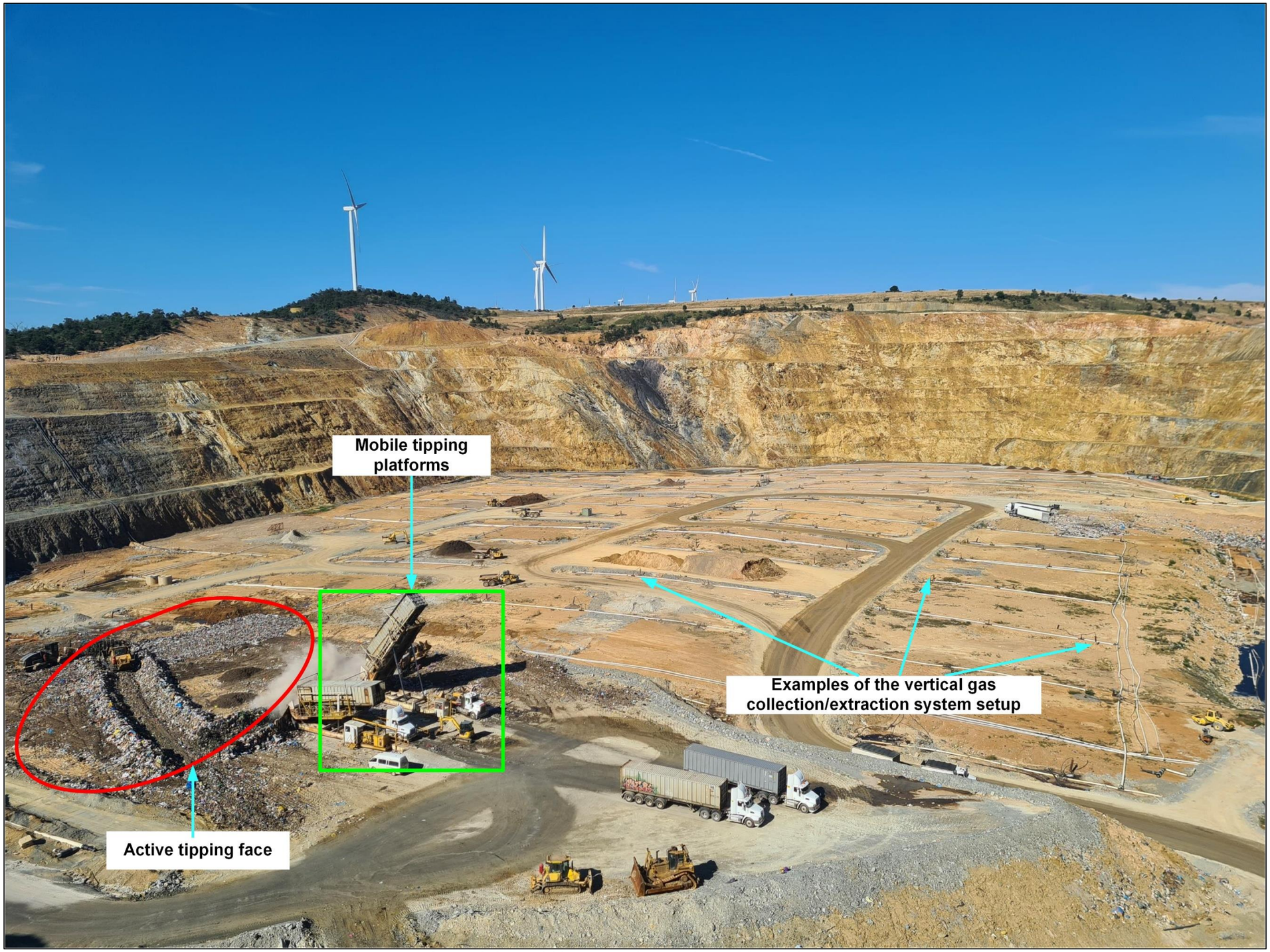


Figure 2.2 – Void layout and operations: 22 March 2022

2.3.1 Bioreactor Operation

The current procedure for operating the Bioreactor consists of the receival of putrescible waste transported to Woodlawn by rail from Sydney after being containerised at one of the Veolia-operated transfer terminal facilities located at Clyde and Banksmeadow. The fully sealed containerised waste is received at and transported by a series of trucks to the Bioreactor, where waste is unloaded via a mobile tipping platform and subsequently transported by a dozer prior to compaction at the ATF area (as highlighted in **Figure 2.2**). The ATF area is progressively covered daily. As advised by Veolia in previous audits, covering the ATF is an on-going operational process, although the daily active tipping area will vary depending on positioning in the Void, gas infrastructure and weather conditions.

As described in the WIPS5 2022, the progress of tipping operations is planned to use the mass of the waste incoming, the available area, the designed finish level, as well as the consideration of landfill gas infrastructure movement. The principle is to minimise the active tipping area to reduce the potential odour emission and reduce the offline duration of landfill gas extraction wells. Once the tipping plan is established, the tipping operation is guided by a global positioning system in the compactor to finish the designed area to the planned elevation. The tipping road construction, related landfill gas infrastructure and stormwater system are also disconnected and reconnected accordingly. It was evident in the Audit that the size of the ATF remains well below the area size specified in the EA 2010 (further discussed in **Section 9.2.1.1.1**).

2.3.1.1 Hydrogen Sulphide Emission Control and Management

When required, it is understood by the Audit that the tipping process is supplemented by H_2S emission control and management measures, including:

- Capture and combustion of landfill gas. This results in the thermal oxidation of the landfill gas prior to atmospheric release;
- Provision to add metal oxide (haematite and/or magnetite) to the waste;
- Provision to apply biocover material to the Bioreactor surface, particularly for the management of discrete areas identified as a pathway for landfill gas release in an uncontrolled manner (operationally referred to as ‘hot spots’); and
- The current procedure for operating the Bioreactor restricts leachate recirculation due to its previously documented impact on landfill gas extraction through leachate pooling effects within the waste mass of the Bioreactor. In effect, this is a form of H_2S emission control by mitigating landfill gas release from the surface in an uncontrolled manner.

Overall, the infrastructure to operationally manage landfill gas extraction and leachate transfer/extraction is critical to the effective management of H_2S emission control and management. This plays a significant role in the management of odour emissions from the Bioreactor operations.

2.3.2 Leachate Extraction and Transfer via the LMS

In the context of the Bioreactor operations, the LMS comprises of three (3) major aspects:

1. Leachate extraction and transfer, including extraction pumps, ring main and tank transfer system, all of which are located within the Void. Leachate reinjection (or recirculation) is a back-up option for leachate transfer within the Void;

2. Leachate treatment via the LTD and LTP (refer to **Section 2.4.4.2** and **Section 2.4.6**, respectively); and

3. Treated leachate management via evaporation, which is discussed in **Section 2.4.1** to **Section 2.4.3.1**.

The Audit notes that if leachate recirculation is utilised within the Void, this is completed via a direct method into dedicated reinjection wells. This has the effect of minimising the exposure of leachate partitioning from the liquid phase to the gas phase through aerosol generation and/or evaporation pathways, which can subsequently lead to the generation of odorous emissions. As the leachate percolates through the upper layers of waste, a proportion of the liquid is retained in the upper layers of waste. Veolia had previously utilised covered reinjection trenches as part of the leachate recirculation process; however, this is understood to remain discontinued as part of the normal operations of the Bioreactor.

As of the Audit, and based on the WIP 2020 and WIPS5 2022, the use of leachate recirculation is no longer needed for maintaining effective steady-state operations within the waste mass of the Bioreactor. It is only used or required during exceptional circumstances. As such, there is only one reinjection infrastructure being kept as a contingency leachate management method when the leachate transfer system experiences any failure or requires maintenance. The reinjection point is currently located in the eastern wall of the void, with a 110 mm high-density polyethylene pipe placed into the waste prior to the RL730 lift (refer to **Figure 6.2** for details). The reinjection point is connected to the ring main and is normally in the closed position. In the circumstance of leachate transfer system failure or any downtime due to maintenance schedule, e.g., pump failure or pipe damage, the valve between the reinjection point and the ring main will be opened to allow the extracted leachate to be re-injected to the waste. The reinjection will be stopped once the leachate transfer system is back to normal operation. The leachate reinjection operational contingency is discussed in **Section 9.2.1.1.1**.

2.3.2.1 Leachate Reinjection Contingency

As part of operational contingency, it is noted in the WIPS5 2022 that another reinjection point will be setup at well J07 (refer to **Figure 6.2**) to supplement the main reinjection point. This will use the whole subsurface rock trench as the leachate storage reservoir. This reinjection trench will only be used when the leachate transfer system fails and will serve to keep the bund area dry and avoid equipment damage. During this operational scenario, repair actions will be conducted as soon as possible. This supplementary

reinjection point is intended to only be used for no more than a day to enable repair/remedial works to be completed.

2.3.3 Landfill Gas Extraction

The landfill gas collection system is constantly expanded to promote better gas capture as waste filling progresses around the Void. The operational management and instalment of landfill gas extraction infrastructure in the Void are extensively described in the WIP 2020, WIPS5 2022, and previous Woodlawn Infrastructure Plans reviewed by the audit team. The configuration during placement of waste on the surface of the Void and a waste lift is designed to ensure streamlined gas (and leachate) extraction. All extracted landfill gas is directed to the on-site power station, with moisture removal undertaken via a series of single or double knock-out pots (referred to as **KOPs** in the WIP 2020 and WIPS5 2022) along the landfill gas flow lines and the main header line.

2.4 LEACHATE MANAGEMENT SYSTEM

The key features of the LMS include the following:

- ED3N, also known as evaporation lagoon 1-4;
- Evaporation Dam 3 South 2 (**ED3S2**), formerly Evaporation Dam 3 South-South (**ED3SS)**;
- LTD; and
- The LTP.

Each of these listed features is described in **Section 2.4.2** to **Section 2.4.6**, respectively. Further details regarding the LMS at the Woodlawn Facility are documented in *Chapter 8* of the EA 2010. All key modifications and upgrades since the EA 2010 are documented as part of the Audit, with technical details provided in the WIP 2020 and WIPS5 2022.

2.4.1 Volume Reduction of Treated Leachate

It is a condition of the Woodlawn Facility's EPL that no leachate (treated or untreated) can be directly discharged from the Woodlawn Facility. The only means of volume reduction is through mechanical and/or natural evaporation processes. The details about the mechanical evaporation process of treated leachate are discussed in **Section 2.4.2.1**.

2.4.2 Evaporation Dam 3 North (ED3N)

ED3N pond system covers a total surface area of 6.1 hectares (**ha**), at top water level (**TWL**), and is divided into four (4) discrete lagoons, namely:

1. **ED3N1:** receives treated leachate from the leachate treatment dam. The pond surface area, as of the Audit, is approximately 0.14 ha (noting that this was found empty in the previous 2020 IOA). At the time of the Audit, there was no current survey information available for the floor of dam ED3N1. Therefore, no volume can be determined;

2. **ED3N2***:* receives treated leachate from the LTD. The pond surface area, as of the Audit, is approximately 0.73 ha. This is equivalent to approximately 84% of the volume storage capacity;

3. **ED3N3**: receives treated leachate from the LTD. The pond surface area, as of the Audit, is approximately 0.68 ha. This is equivalent to approximately 89% of the volume storage capacity; and

4. **ED3N4**: receives treated leachate from the LTD. The pond surface area, as of the Audit, is approximately 36.6 ha, equivalent to approximately 86% of the volume storage capacity. There are up to five mechanical evaporators available that draw treated leachate from ED3N-4 to promote evaporation as a means of volume reduction. Further details on the mechanical evaporation process at the Woodlawn Facility are described in **Section 2.4.2.1.**

Note: The surface areas and volumes of ED3N were as of March 2022 and provided by Veolia. The surveying is completed by an external contractor. At least 0.5 metres (**m**) of freeboard is always maintained in the ED3N pond system.

2.4.2.1 ED3N - Mechanical Evaporation System

The Evaporator Manual outlines the internal protocol and procedures for the operation of the mechanical evaporation system for ED3N pond system.

2.4.2.1.1 Evaporation System A

A mechanical evaporation system is currently active at the Woodlawn Facility to manage the growing need for volume reduction in the ponds to retrieve storage capacity. The mechanical evaporation system is described and operated as per the WIP 2020 and WIPS5 2022. For ED3N4, the mechanical evaporation system at the Woodlawn Facility consists of four (4) Turbomist® evaporation units, driven by a common pump system. It is understood that the actual operating performance of the evaporation units is approximately 840-900 litres per minute (**L/min**). This evaporation mechanism is known as System A, as shown in **Figure 2.3**.

2.4.2.1.2 Evaporation System B

System B, which is a surface spray evaporator system, is composed of six (6) sprays (one in each of ED3N2 and ED3N3, and four in ED3N4) floating in the middle of the dams and controlled by a weather station on the western bank of ED3N4. At the time of the Audit, ED3N1 was empty and therefore did not have an active surface spray evaporation system. The operation of System B is in accordance with the feedback provided by the weather station, including temperature, humidity, wind direction and wind speed. Each of the sprayers is controlled independently, with setpoints based on weather conditions. As shown in **Figure 2.3**, the nominal location of each surface spray evaporator and the operating wind direction range is presented as arrows, with the span range visually illustrated. As documented in the WIP 2020, System B is still under an active trial period, and the setpoints are being tested to ensure the spray mist will not drift out of the dam area. As the humidity and temperature conditions vary across the seasonal cycles, the setpoint for wind speed is modified accordingly. The operation and effectiveness of System B are regularly reviewed by the Woodlawn Facility, and

setpoints are optimised as required. A photo showing the operation of the surface spray evaporator system is shown in **Figure 2.4**.

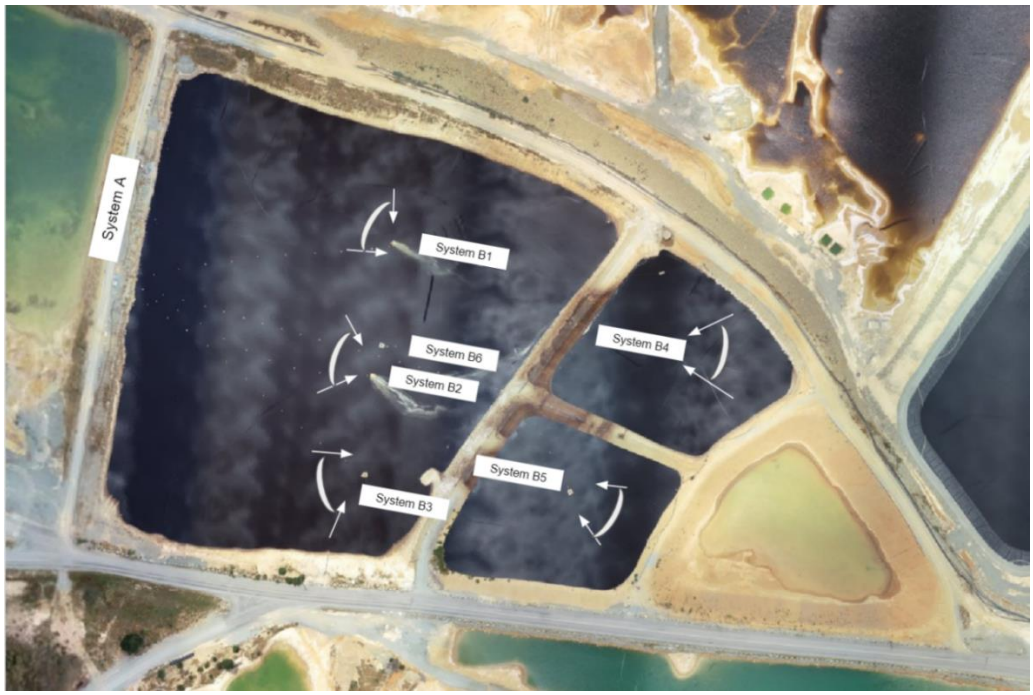


Figure 2.3 – The mechanical evaporation system layout for ED3N (**Source:** WIP 2020)

Figure 2.4 – Operation of Evaporation System A and System B (**Source:** WIP 2020)

2.4.2.1.3 Middle Bank Evaporation System

To further enhance mechanical evaporation capability and volume reduction at the Woodlawn Facility, an evaporation system is installed in the ED3N area, located in the middle bank, as shown in **Photo 2.1** and **Figure 2.5**. An electric pump is set up and moved between ED3N2 and ED3N4, discharging into the spray system on the middle bank of the ponds. As the spray is at a modest distance from the external boundary of the ED3N area and the injection spray height is low, this system has the capacity to operate under most weather conditions. It is only turned on manually, weather dependent. During active operation, this spray system is controlled by a timer that operates based on seasonal conditions.

Photo 2.1 - A view of the ED3N middle bank spray evaporation system (outlined in red): 21 March 2022

Figure 2.5 – The ED3N middle bank spray evaporation system (**Source**: WIP 2020)

2.4.3 Evaporation Dam 3 South 2 (ED3S2)

ED3S-2 receives treated leachate from the LTD. At the time of the Audit, ED3S2 was at approximately 98% volume storage capacity, equivalent to a water surface area of approximately 2.2 ha. A photo of ED3S-2, as occurred during the Audit, is shown in **Photo 2.2**. Note: The surface areas and volumes of ED3S2 were as of March 2022 and provided by Veolia. The surveying is completed by an external contractor. At least 0.5 metres (**m**) freeboard is always maintained in the ED3S2 pond system.

Photo 2.2 – ED3S2: 21 March 2022

2.4.3.1 Mechanical Evaporation System

The Evaporator Manual outlines the internal protocol and procedures for the operation of the mechanical evaporation system for the ED3S2 pond system. A ring main evaporation system is installed away from the bank of ED3S2. A total of four spray bars, each bar with 5-6 nozzles, are installed at the north, west, south, and east of ED3S2, respectively, approximately 2 m away from the bank. The spray nozzles are controlled by an in-situ weather station and operate only when the wind is blowing from a certain direction, i.e., behind the bank into the dam. In addition to the ring main evaporation system, ED3S2 has three floating surface spray evaporators, similar to that described in **Section 2.4.2.1.2**. The operation of the surface spray evaporators occurs only during the daytime on weekdays and based on weather conditions.

2.4.4 Evaporation Dam 1 Coffer Dam

The Evaporation Dam 1 (**ED1**) coffer dam stores treated effluent from the LTP. At the time of the Audit, ED1 Coffer Dam was at approximately 93% volume storage capacity, equivalent to a water surface area of approximately 64.7 ha

2.4.4.1 Mechanical Evaporation System

The Evaporator Manual outlines the internal protocol and procedures for the operation of the mechanical evaporation system for ED1 Coffer Dam. A similar ring main evaporation system to that installed in ED3S2 (refer to **Section 2.4.3.1**) is being installed in ED1 coffer dam. Due to the shape configuration of ED1 coffer dam, there are five (5) spray stations, as shown in **Figure 2.6**. The spray system works on the discharge pump from LTP, so the spray system will activate when LTP is discharging.

Figure 2.6 – ED1 Coffer Dam: Proposed Evaporation Spray System (**Source**: WIP 2020)

2.4.4.2 Contingency Storage Capacity

As previously mentioned, effluent from the LTP is transferred to ED1 coffer dam for storage and evaporation. ED1 coffer dam needs to maintain a minimum freeboard of 0.5 m. As outlined in the WIP 2020 and WIPS5 2022, a new dam for LTP effluent is intended to be constructed once ED1 coffer dam reaches 80% of the volume storage capacity. As indicated in **Section 2.4.4.2**, this setpoint has been met (93% volume storage capacity), and Veolia should proceed with the design and planning of additional storage capacity via the construction of a new dam.

2.4.5 Leachate Treatment Dam

The LTD is in the upper north-western edge of the Void and is an integral part of the LMS at the Woodlawn Facility. Leachate from the Void is pumped directly to the LTD as required. Since the 2012 IOA, the LTD was upgraded from a batch-based wastewater treatment system to a continuous configuration. The upgraded system was commissioned in April 2013. Following this upgrade, the LTD process was modified since the previous audit to consist of anoxic and aeration zones to increase the efficiency of the leachate treatment process. **Photo 2.3** shows the LTD as occurred during the Audit, and **Figure 2.7** illustrates the current continuous treatment configuration for the LTD.

The LTD has a hydraulic retention time (**HRT**) of 33 days (dependent on treatment flow) and is capable of the continuous treatment of approximately 259,000 – 346,000 litres per day (**L/day**) of untreated leachate, equivalent to a current maximum treatment capacity of 3-4 litres per second (**L/s**). The raw leachate is pumped from the Void and discharged into the anoxic zone of the LTD for denitrification. Following treatment in the anoxic zone, the leachate migrates to the aeration zone to promote mixing, oxygen transfer and nitrification. The effluent from the aeration zone of the LTD is dosed in-situ with ferric sulphate (**$Fe_2(SO_4)_3$**) and a polymer to facilitate coagulation and flocculation processes before passing through a settling tank known as the Woodlawn Aerated Leachate Treated Effluent Refiner (**WALTER**). Under this treatment configuration, the LTD requires desludging at a frequency that is determined by Veolia experts. The sludge from the settling tank is returned to the LTD as required. Any sludge from the desludging process (and any excess sludge that may be generated) is transported and returned to the waste in the Void where it is buried and covered. A process flow schematic for the LTD is shown in **Figure 2.7**.

Photo 2.3 – A view of the LTD: 21 March 2022

2.4.6 Leachate Treatment Plant

As previously mentioned in **Section 2.1**, the Woodlawn Facility has constructed and commissioned the LTP as the long-term leachate management strategy, which is continuing to undergo process-proving, optimisation, and stabilisation. As indicated in the WIP 2020, the LTP is in the process proving stage which includes, but is not limited to, biomass growth, biological process tuning and process optimisation. The LTP is located on the northern side of the Void, between the Bioreactor and Evaporation Dam 1 (as shown in **Figure 2.1**), and consists of a membrane bioreactor (**MBR**) treatment system with a design capacity of approximately 4 L/s. The MBR system has been designed as a modified activated sludge biological process to treat the main parameters found in the raw leachate extracted from Bioreactor to a higher quality effluent.

A process flow schematic of the LTP is provided in **Figure 2.8,** with a flow schematic of the upgraded leachate management system at the Woodlawn Facility is shown in **Figure 2.9**.

The key treatment process stages of the LTP include:

1. A primary treatment stage, including screening to remove gross solids, large materials, and other pollutants;

2. A balance tank to regulate treatment flow;

3. Anoxic Tanks;

4. Aeration Tanks; and

5. An ultrafiltration membrane system (noting that an additional ultrafiltration membrane system train is being installed and commissioned before end of 2022).

The product of the process stages above is a high-quality effluent that will be stored in the ED1 coffer dam. Given that the LTP continues to undergo process-proving, optimisation, and stabilisation, the critical control points and limits are continuously monitored with alarms and automatic shutdown using a dedicated Supervisory Control and Data Acquisition (**SCADA**) controls system if critical limits are reached. A view of the LTP is shown in **Photo 2.4**. A process flow schematic and diagram of the LTP is shown in **Figure 2.8** and **Figure 2.9**. An overview of the LTP flow concept is shown in **Figure 2.10**.

Overall, from an odour emissions viewpoint, the Audit has obtained leachate treatment data of the effluent from the LTP and can comment that it is of a quality that will contribute negligible levels of odour. At the time of the Audit visit, ED1 coffer dam was at approximately 93% volume storage capacity, as shown in **Photo 2.5**. Unlike in the previous 2020 IOA, given the current water level height, it was possible during the Audit to gain safe access to ED1 coffer dam to enable odour sampling and testing via area source sampling (refer to **Section 4.2** and **Section 6.1.5** for details).

2.4.7 Wet Weather Management

The LTD and LTP are currently operated simultaneously at the Woodlawn Facility, providing an improvement in leachate management and treatment capacities from the Void, particularly in managing wet weather conditions. As noted in the Leachate Assessment, Veolia has increased leachate extractions since May 2021 to reduce leachate volumes in the Void and to increase the depth of the unsaturated zone. This is achieved via the deployment of additional mobile pumps and sumps/dams/drainage in the Bioreactor to address the wet weather period. This matter is further discussed in **Section 9.2.1.1.4**.

Photo 2.4 – A view of the LTP as found during the Audit: 24 March 2022

Photo 2.5 – ED1 Coffer Dam: 21 March 2022

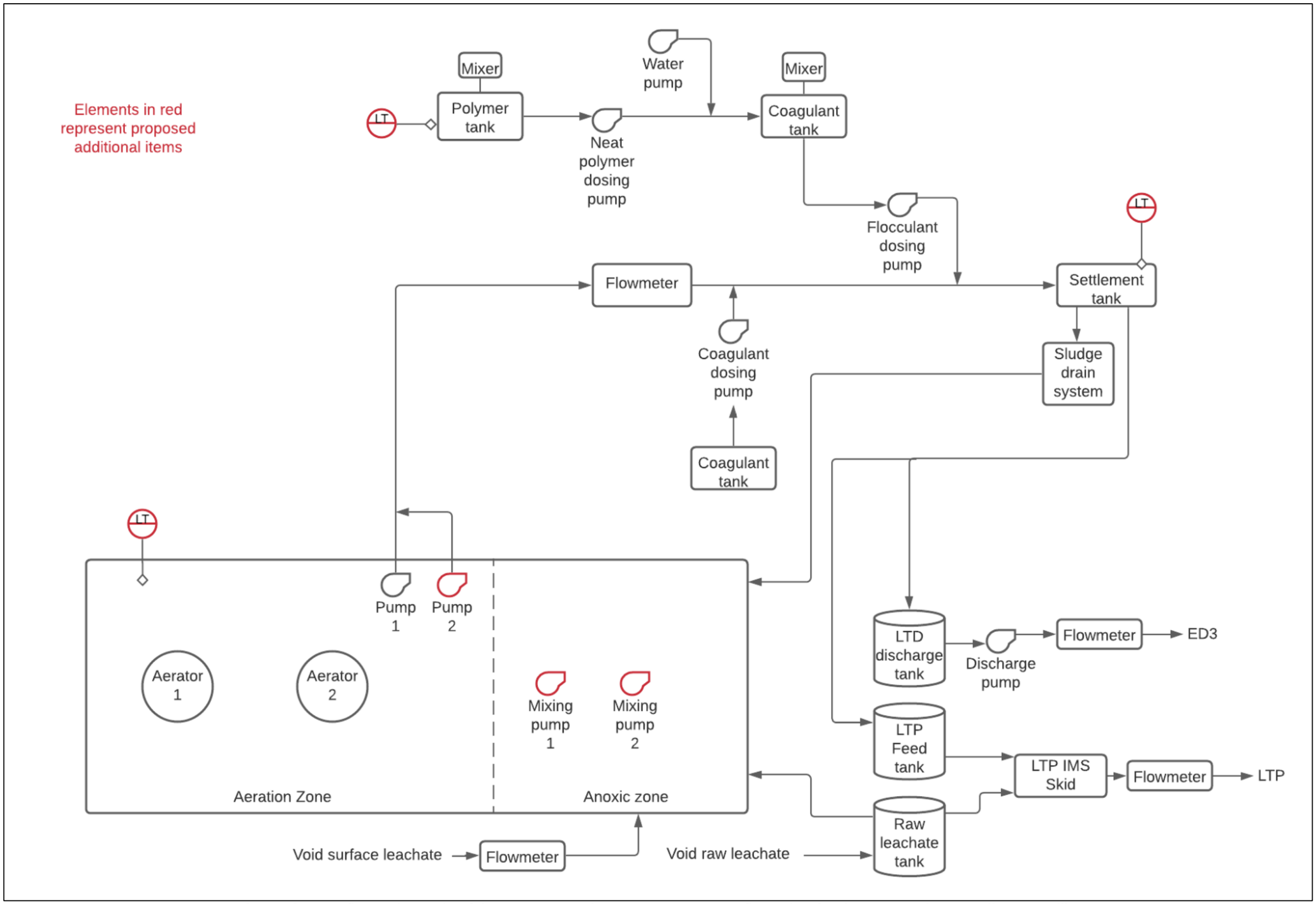


Figure 2.7 – A flow schematic of the current continuous treatment configuration for the LTD at the Woodlawn Facility

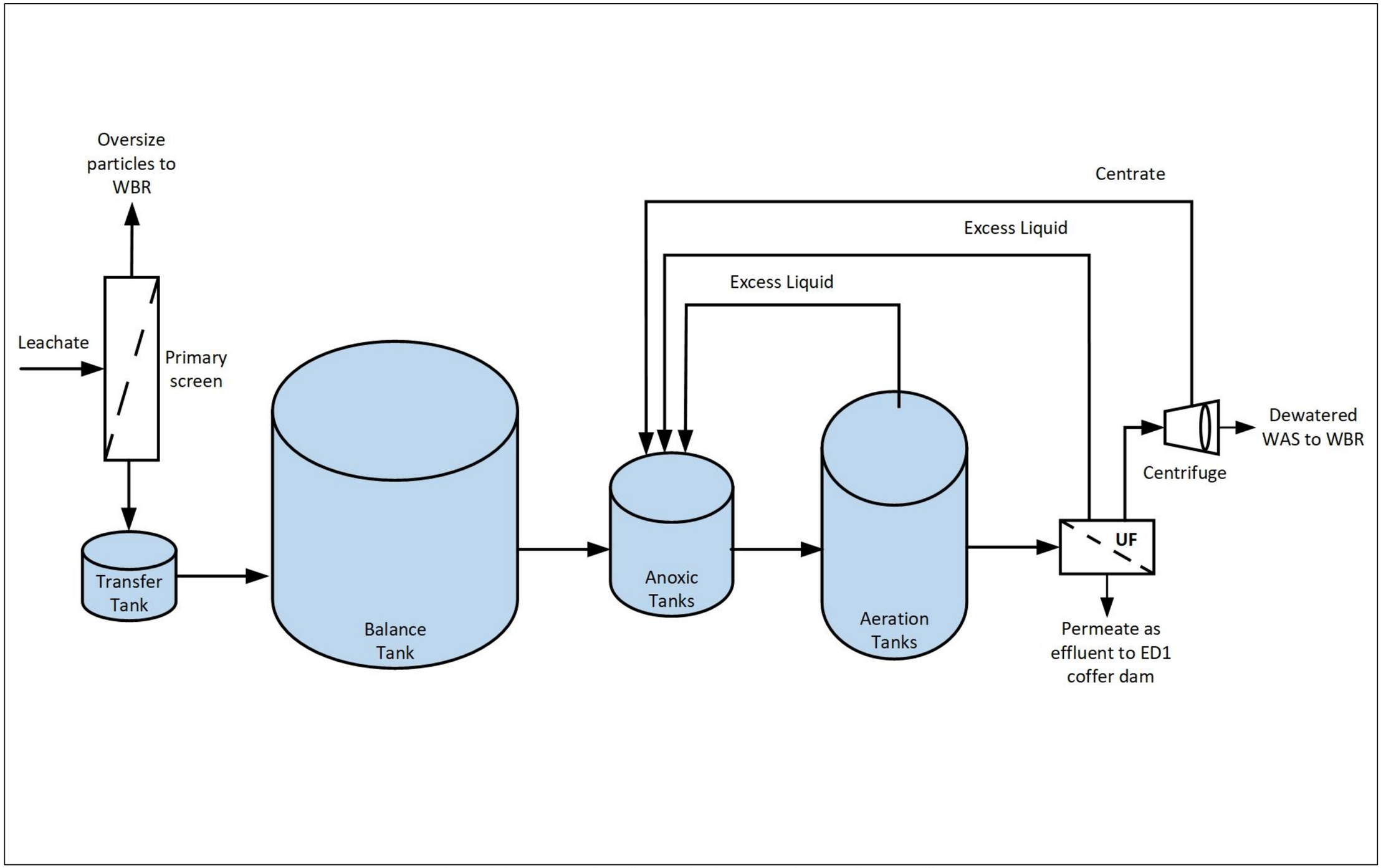


Figure 2.8 – Process flow diagram for the LTP at the Woodlawn Facility

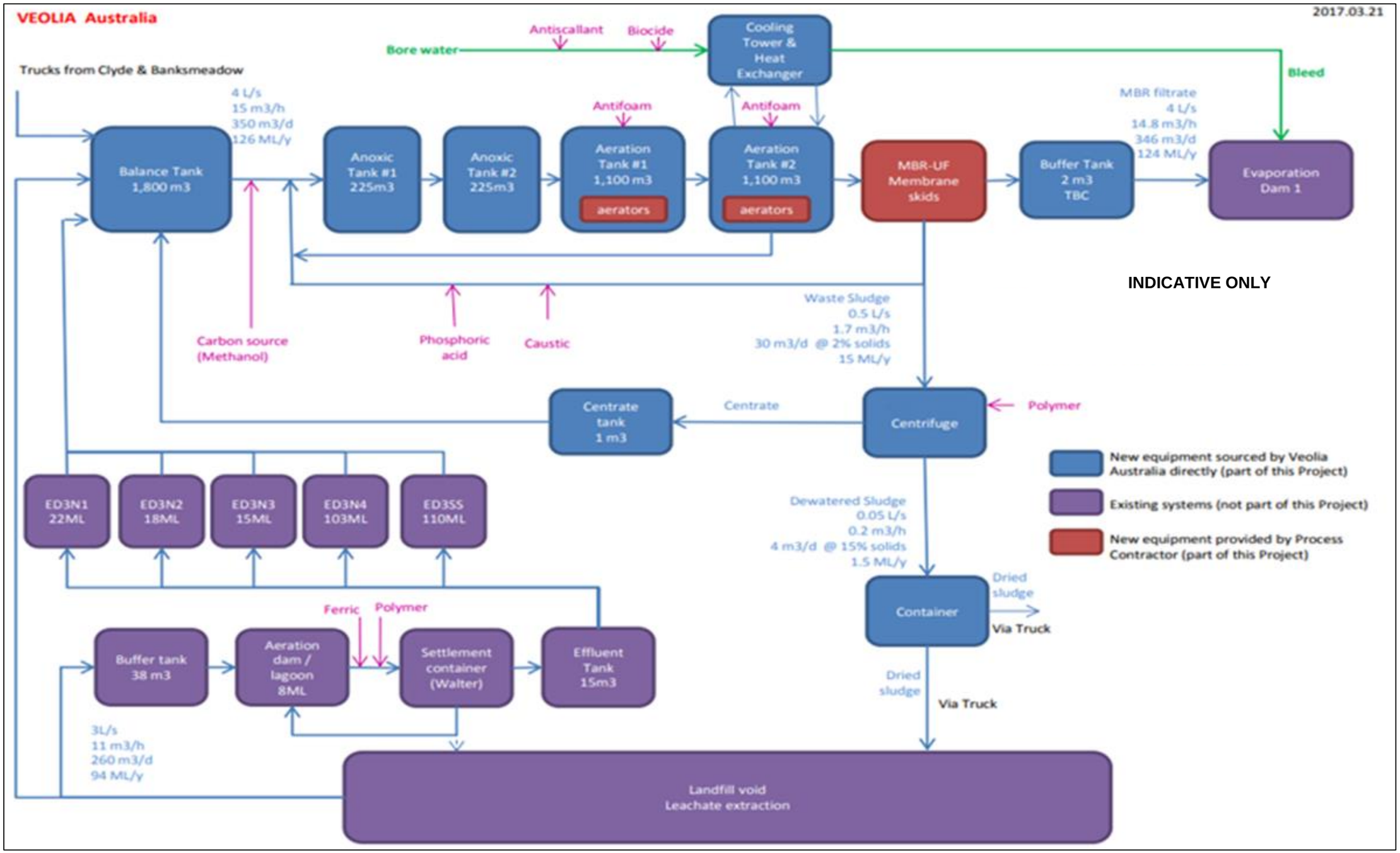


Figure 2.9 – A flow schematic of the upgraded leachate management system at the Woodlawn Facility (**Source:** Previous IOA 2019)

Figure 2.10 - Concept layout of the LMS for the Bioreactor at the Woodlawn Facility (**Source:** WIP 2020)

2.5 STORMWATER MANAGEMENT

2.5.1 ED3S1 Stormwater

Evaporation Dam 3 South 1 (**ED3S1**) continues to receive stormwater runoff which is managed as acid mine drainage. At the time of the Audit, ED3S1 was at approximately 70% volume storage capacity, equivalent to a water surface area of approximately 7.4 ha

2.5.2 Stormwater Infrastructure in the Void

During stormwater events, all stormwater pumps operate to ensure stormwater water is transferred to ED3S1. According to the WIP 2020, the Void has been divided into multiple sub-catchment areas, as shown in **Figure 2.11**. Each sub-catchment has either natural or engineered drainage and flow control infrastructure, such as concrete dish drains, clay berms, pumps, and pipes to manage stormwater captured in the area. These systems minimise the amount of stormwater flow from the Bioreactor walls onto the waste surface of the Void and, in turn, the potential generation of excess leachate from stormwater flows. At the current stage, as shown in **Figure 2.12**, the stormwater management system is composed of seven (7) on-duty pumps and seven (7) buffer ponds, as well as the related water drain, diversion, and delivery pipework system. A schematic of this stormwater management protocol is demonstrated in **Figure 2.13**.

2.5.2.1 Management of Contaminated Surface Water

Surface water collected on the covered landfill surface is drained to temporary storage ponds. Where it is suspected that leachate may have contaminated surface water, a sample is collected to test ammonia (a key indicator for contamination) to demonstrate that the water quality is suitable for discharge to ED3S1. If it is found that the surface water has encountered waste or leachate, the water will be managed as leachate through the established treatment pathways of the LMS.

2.5.2.2 Management of High Rainfall Events

Any stormwater into the Void, especially the portion that directly falls on the waste surface of the Void and the run-off from the upper benches, is one major source of excess leachate generation. As documented in the WIP 2020, it is indicated that leachate generation is very sensitive to high rainfall events due to the large, increasing catchment area and partial stormwater interception (the implication of this is discussed in **Section 9.2.1.12**).

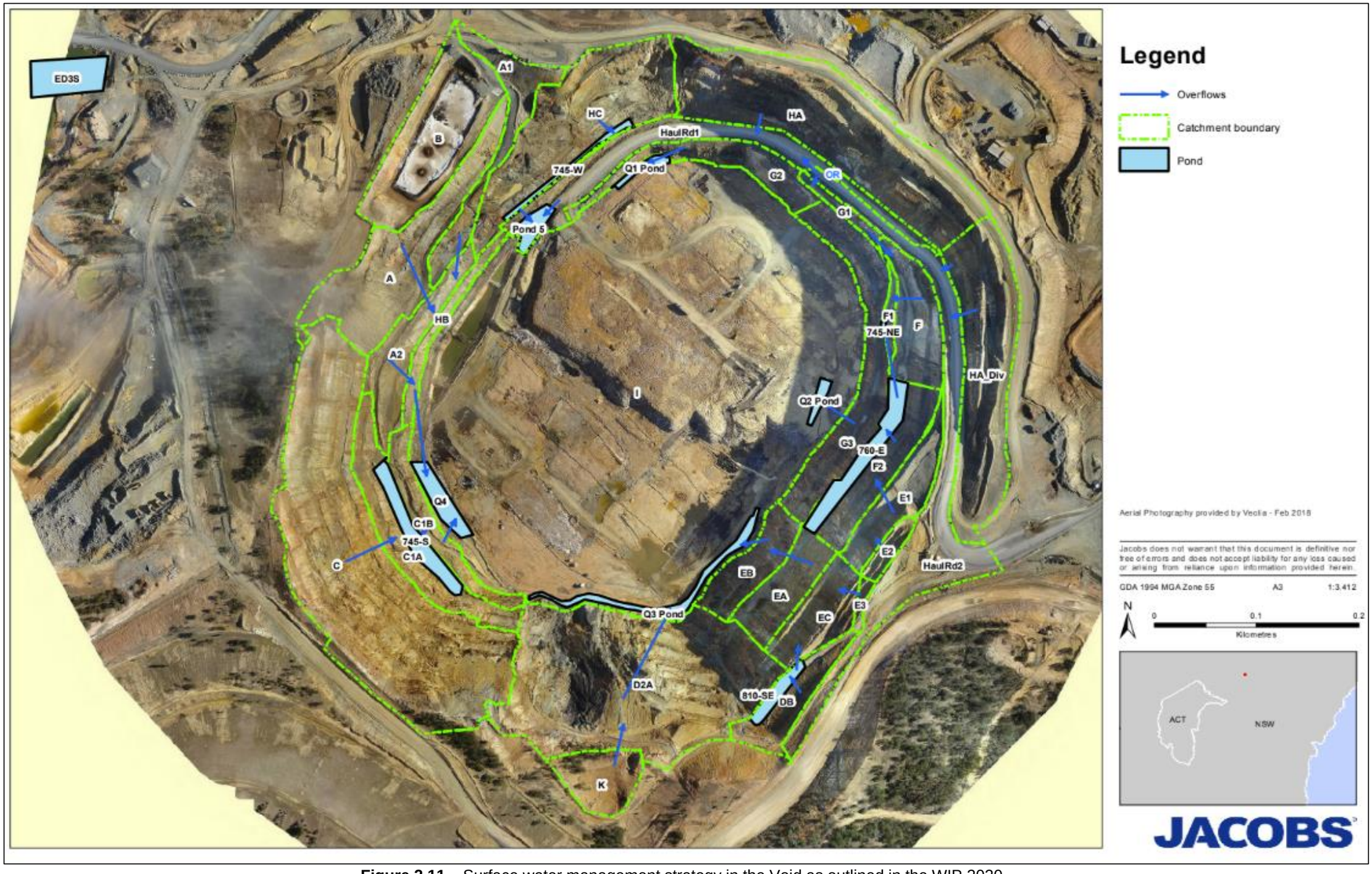


Figure 2.11 – Surface water management strategy in the Void as outlined in the WIP 2020

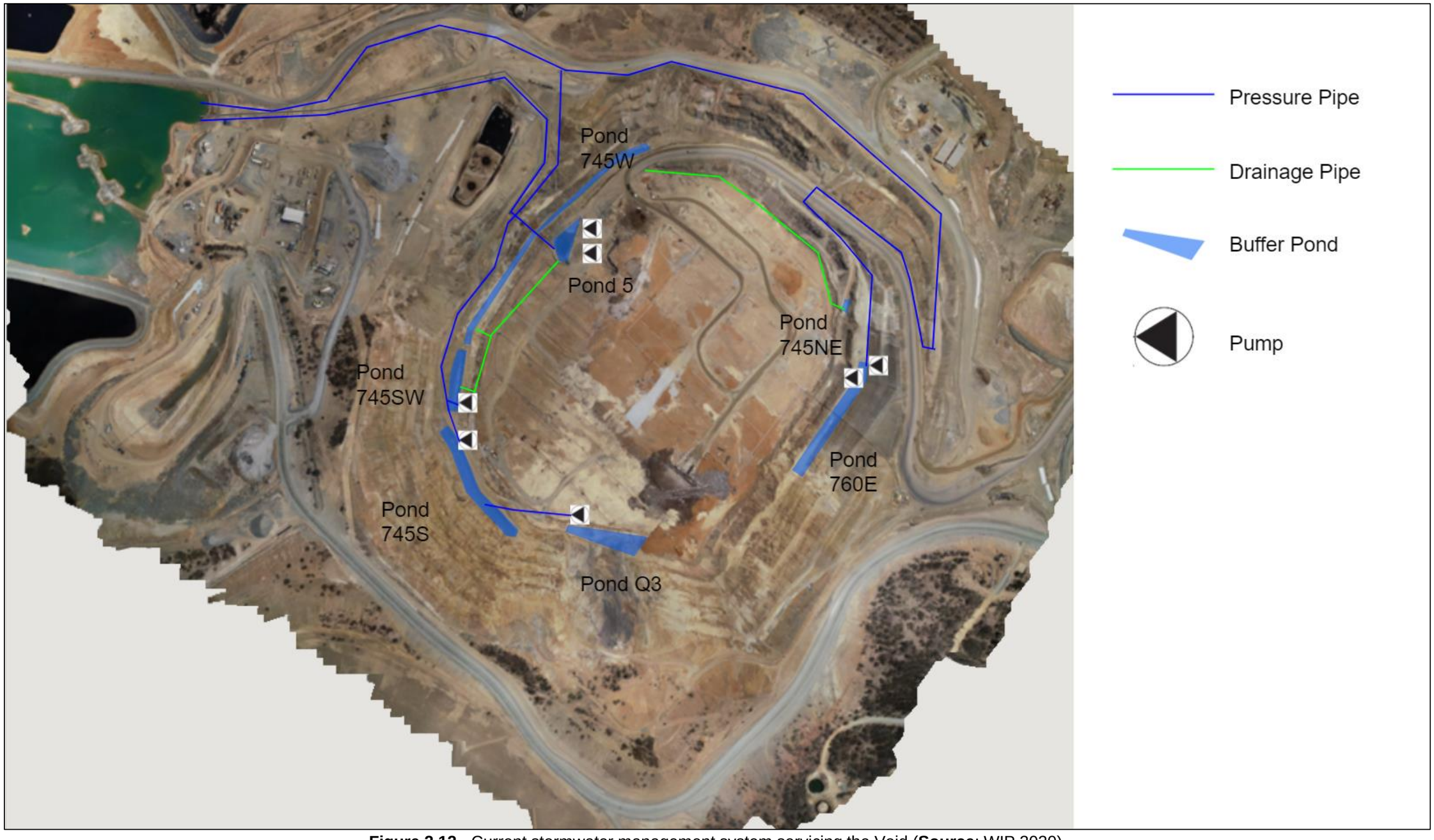
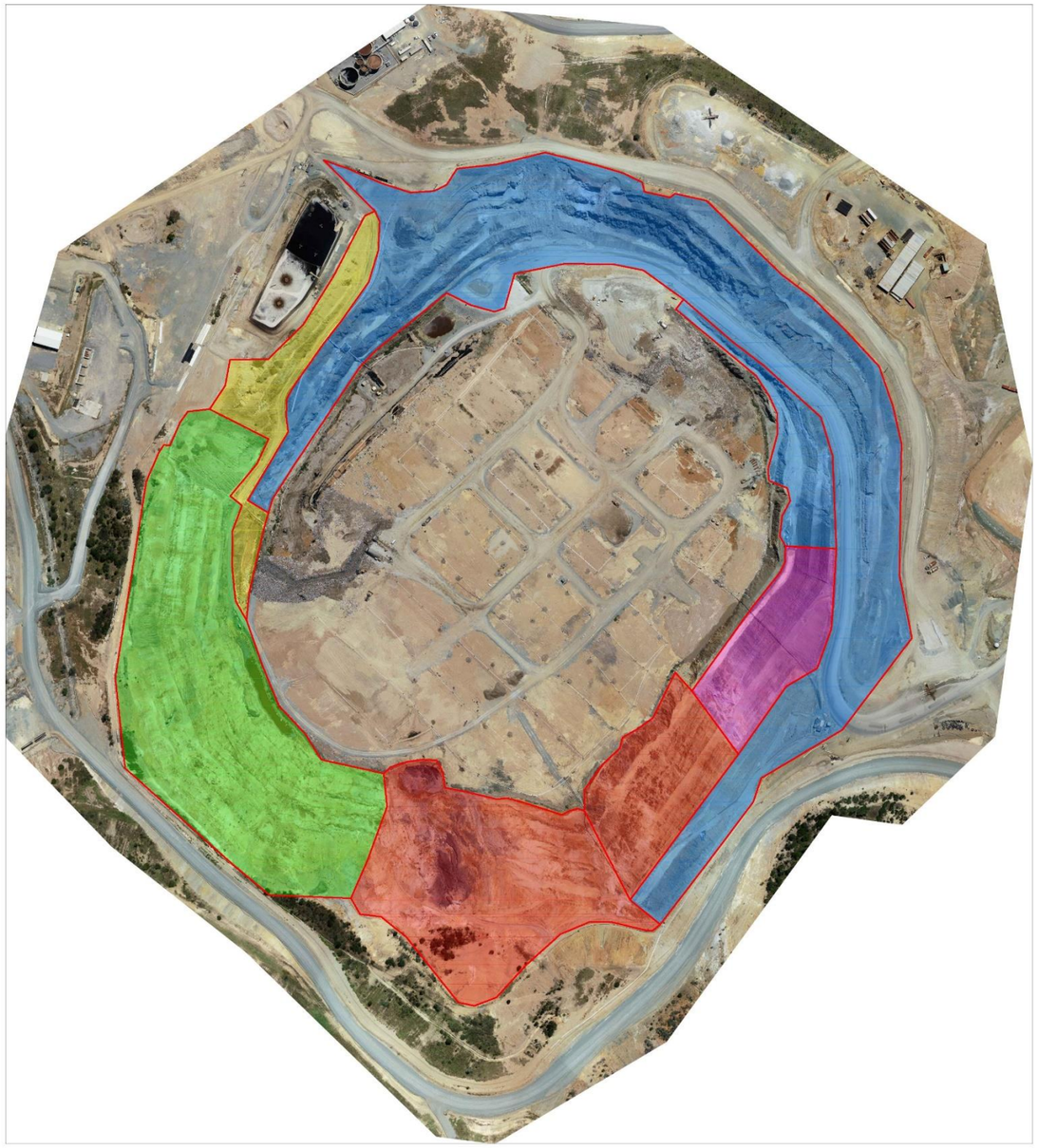


Figure 2.12 - Current stormwater management system servicing the Void (**Source**: WIP 2020)



WBR Void Stormwater Catchments Map

Pond 5 catchment area.
Pioneer pump and HH220i pump.

760E bench catchment area.
2 x HH160i pump.

South-East (SE) corner catchment area.
HH220i pump

745S catchment area.
HH160i pump

745SW catchment area.
HH160i pump.

* Stormwater accumulated on the surface of covered waste will follow the pyramid shape profile and drain to the 4 corners of the void floor. If there is potential contamination, NH_3-N test will be conducted to determine if the water can be treated as stormwater or leachate.

Figure 2.13 - Void Stormwater Catchment Map (**Source**: Veolia)

2.6 MBT FACILITY OPERATIONS

The MBT Facility at the Woodlawn Facility operates under a separate EPL to the Bioreactor operations and is approved to process up to 240,000 tpa of mixed waste and 40,000 tpa of garden waste. The existing MBT Facility infrastructure is capable of processing up to 144,000 tpa of putrescible waste. To that end, the MBT Facility includes the following infrastructure for its operations:

- An access road for waste trucks (entering and exiting the facility from Collector Road);
- Car parking, weighbridge, and amenities;
- Reception building and associated infrastructure;
- Biological Refining System (**BRS**) drums;
- Refining building;
- Organic buffer storage building;
- Fermentation building;
- Maturation pad storage area; and
- An odour control facility, based on biofiltration technology (refer to **Section 2.6.3** for details).

Operationally, the MBT Facility includes the receipt of solid waste from municipal, commercial, and industrial sources within the Sydney Metropolitan Area. As of the previous 2020 IOA, the MBT Facility received consent to accept 20,000 tpa of Food Organics and Garden Organics (**FOGO**) as part of its existing approval that permits it to process up to 240,000 tpa of mixed waste and 40,000 tpa of garden waste. There was no change required to the infrastructure at the MBT Facility to enable FOGO material to be processed. All municipal solid waste (**MSW**) and FOGO streams are transported in a similar manner to the Bioreactor, which is via the IMF. The MSW and FOGO streams consist of different process flow through the MBT Facility – this is described in **Section 2.6.1** and **Section 2.6.2**, respectively.

2.6.1 MSW Process Flow

Upon receipt at the MBT Facility, the MSW stream is processed in the following manner:

- Waste is accepted, weighed, and unloaded on the Reception Building pit of the waste processing building, where it is screened for conforming waste;
- Waste is then loaded to the BRS drums in batches to ensure a maximum residence time of 3-4 days;

- The waste from BRS drums is transferred to Refining Building for mechanical sorting with equipment, such as trommels, to separate waste into different sized fractions, magnets to remove ferrous material and ballistic separators to segregate light organic material from inorganic material for composting. The refined and screened organic material is provisionally stored in the Organic Buffer Storage Building;

- The refined and screened organic material is transferred from the Organic Buffer Storage Building to the Fermentation Building for composting. Aerated stockpiles of the organic material are formed in specially designed cells through an automated delivery system. Temperature and airflow are regulated through a dedicated SCADA system to ensure optimum and controlled conditions for composting to occur. The process of fermentation will effectively create a biologically stable product, at the end of which the compost produced will be moved into the Maturation Storage Pad Area, located adjacent to the fermentation buildings, until required for use; and

- Recovered ferrous metals are captured in the bin located outside the Refining Building and transport off-site. Any residual material is sent to the Bioreactor for disposal.

The MSW process flow schematic at the MBT Facility is provided in **Figure 2.14**.

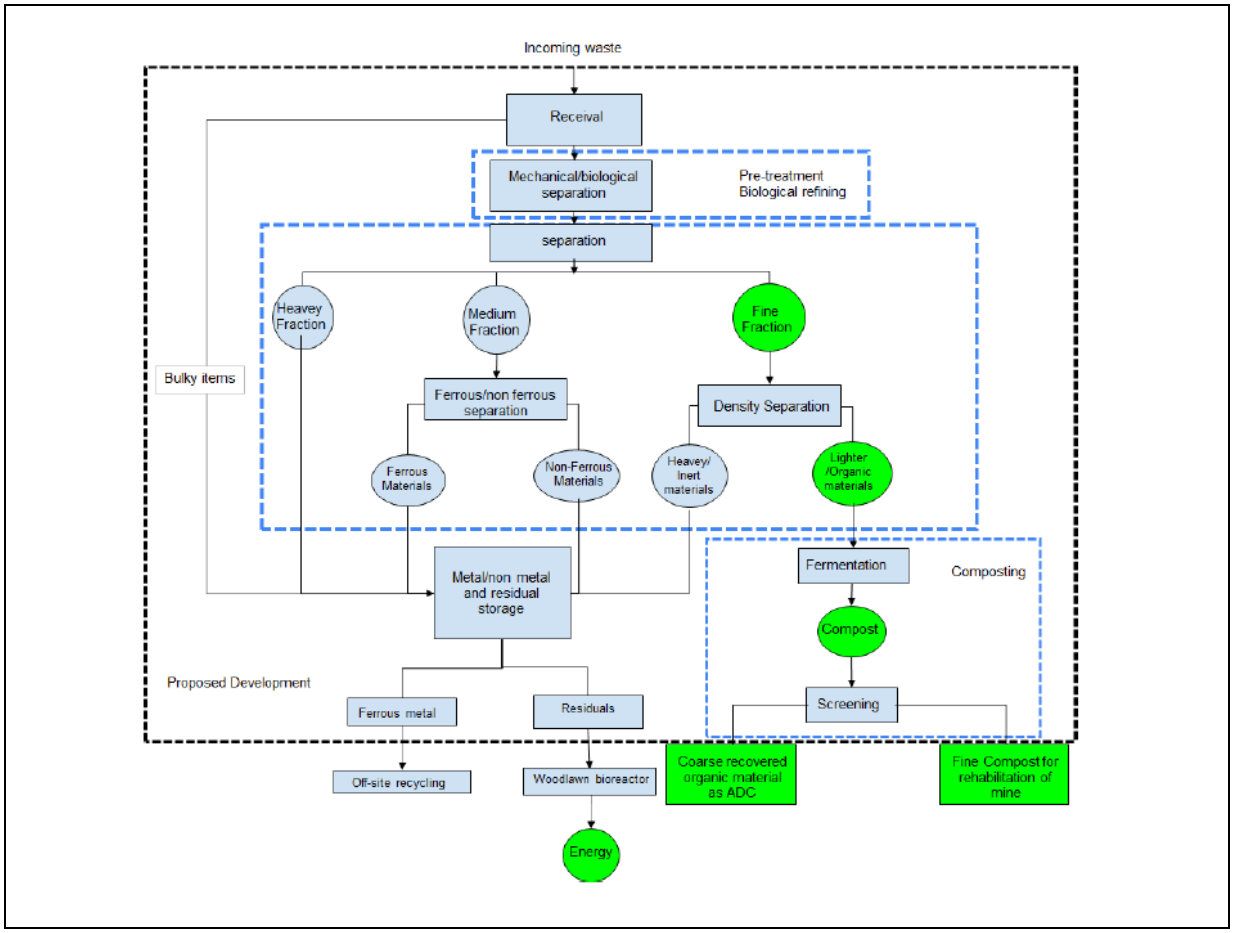


Figure 2.14 – MSW process flow at the MBT Facility (**Source**: the MBT OEMP)

2.6.2 FOGO Process Flow

As previously mentioned in **Section 2.6,** the FOGO material is received at the MBT Facility in sealed waste containers similar to the current waste transportation method used for mixed waste and garden waste. The number of FOGO containers is approximately 2-3 per day, equivalent to 60 to 90 tonnes per day. Upon receipt at the MBT Facility, the FOGO stream is processed in the following manner:

- the containerised FOGO material is tipped directly into the Organic Storage Buffer Building for processing. No unprocessed FOGO will be stored outside the operational hours of the MBT Facility. It takes approximately 45 minutes to move a container load of material to the organic buffer storage building for processing; and

- Once processed within the organic buffer storage building, the FOGO material is processed in a similar manner to the current MSW streams received at the MBT Facility (refer to **Section 2.6.2**).

The FOGO process flow schematic at the MBT Facility is provided in **Figure 2.15**.

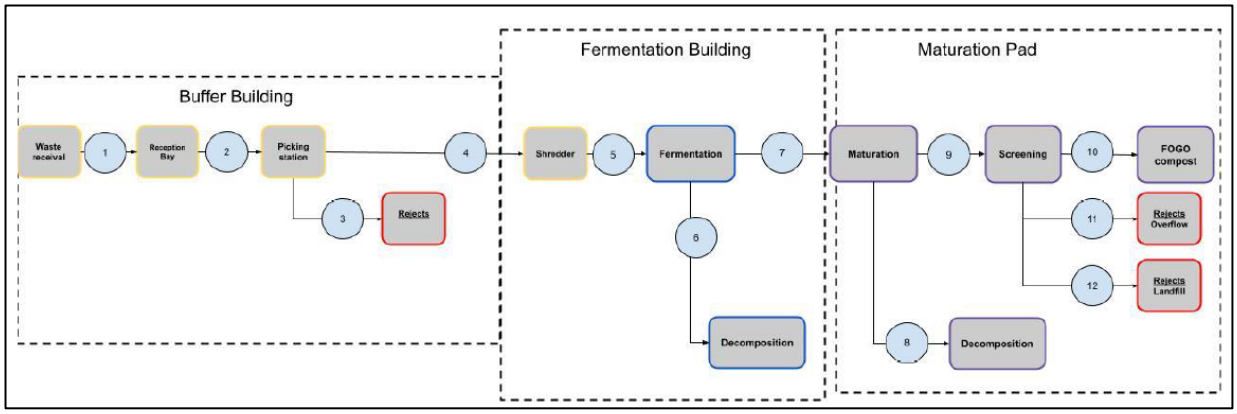


Figure 2.15 – FOGO process flow at the MBT Facility (**Source**: the MBT OEMP)

2.6.3 Odour Control System

To facilitate the operations from an odour management perspective, the MBT Facility has been designed with a purpose-built biofilter-based odour control system. There are two biofilter systems at the MBT Facility, namely:

- **Odour Control System 1**, which is responsible for treating process and building airflow from the Reception Building and BRS Drum System. The design airflow for Odour Control System 1 is 81,200 m^3/hr; and

- **Odour Control System 2**, which is responsible for treating the process and building airflow from the Organic Buffer Storage, Fermentation Building and Refining Building. The design airflow for Odour Control System 2 is 175,500 m^3/hr.

The Audit understands that the design philosophy for both odour control systems was identical in that consideration was given to the type of processes that will be occurring

in the MBT Facility, the potential for each of these processing areas to generate odours, the layout of the MBT Facility site, the proximity of the Woodlawn Facility to potential odour receptors, and experience base from several other large in-vessel composting facilities across Australia. The product of this process resulted in a design that achieves the following objectives:

- Capture and/or containment of all odours generated at key processing areas, including the Reception Building, BRS Drum System, Refining Building, and Organic Buffer Storage Building;
- The maintenance of negative pressure conditions in the above areas under normal operating conditions;
- The capture of the bulk of the odours generated in the Fermentation Building, without necessarily achieving negative pressure conditions; and
- Treatment of all odour captured by the two independent collection systems in a pair of up-flow, open-bed biofilters, each equipped with a foul air humidification system.

2.6.4 MBT Odour Emissions Identification and Characterisation

An operational odour analysis was undertaken to identify and characterise all key emission points at the MBT Facility to facilitate the sampling program conducted in the Audit. This analysis resulted in the following key sources of interest:

- The biofilter system performance outlet discharge cells; and
- The maturation storage pad area.

All other locations are considered negligible, provided the odour control system infrastructure, operating setpoints, and design practices are followed and adequately maintained.

2.6.5 Leachate Aeration Pond

The Audit understands that the Bioreactor operations and MBT Facility are required to manage leachate independently, i.e., no extraction, transfer, or storage between the two operations). As such, the MBT Facility consists of a leachate aeration pond (**LAP**) responsible for managing leachate from the following areas:

1. Maturation Pad; and
2. Biofilter System.

The northern end of the Maturation Pad consists of a V-drain designed to intercept leachate prior to flowing to the LAP. An example of the V-drain is shown in **Photo 2.6**. A view of the LAP as found during the Audit is shown in **Photo 2.7**. Similar to the Bioreactor operations, volume reduction can be achieved via either natural or mechanical evaporation (limited) as well as reused in the MBT Facility operations (if required).

The management protocol for the LAP is based on an aerobic treatment process using several venturi aerators. In this design, there is a loop to draw leachate from the pump and introduce the leachate into a venturi aerator. The venturi effect creates a vacuum and the air is pushed into the leachate, which promotes favourable mixing with the leachate, prior to discharge in the LAP. This process increases the dissovled oxygen level of leachate promoting and maintaining favourable aerobic conditions pond. A concept design schematic of the LAP treatment process is shown in **Figure 2.16**.

2.6.5.1 Volume Reduction Process

Similar to the Bioreactor operations, the treated leachate from the LAP is either naturally or mechanically evaporated. For the mechanical evaporation capacity, the design details were unavailable to the Audit at the time of writing. However, given the size of the LAP relative to the LMS for the Bioreactor operations, it is not considered to be a significant contributor to odour emissions provided optimum aerobic conditions are maintained. As such, no further analysis is conducted on this feature of the LAP at the MBT Facility.

Photo 2.6 – A view of the V-drain servicing the Maturation Pad at the MBT Facility: 24 March 2022

Photo 2.7 – A view of the LAP at the MBT Facility: 24 March 2022

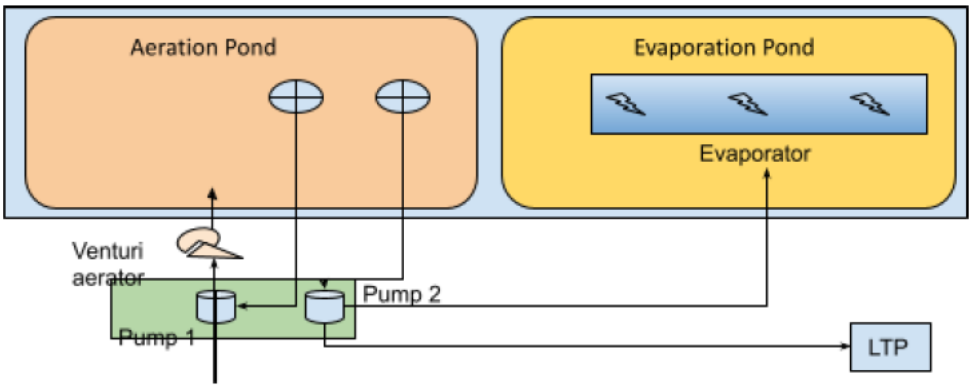


Figure 2.16 – A concept design schematic of the LAP at the MBT Facility

3 SAMPLING PROGRAM

As per *Condition 7 (e)* of *Schedule 4* in the *Specific Environmental Conditions - Landfill site,* this Audit measured all current and key sources at the Woodlawn Facility. As previously highlighted in **Section 1.3**, the odour emissions inventory developed in previous IOAs was used as a basis for the sampling program in the Audit and updated where required.

3.1 SAMPLING SCOPE

The Audit involved the collection of a total of seventy-four (74) gas samples, namely:

- Fifty-two (52) gas samples for odour concentration measurement; and
- Twenty-two (22) liquid samples for odour concentration measurement testing using an in-house National Association of Testing Authorities (**NATA**) accredited Liquid Odour Concentration Determination Method (refer to **Section 4.3** & **Appendix B** for details). The liquid samples, whilst not being a requirement for the Audit, were collected from the pond sources containing treated leachate, including ED3N-2, ED3N-3, ED3N-4, ED3S2, ED1 Coffer Dam, LTD and LAP to quantify the odour emissions caused by the natural or mechanical evaporation of the lagoons liquid contents (refer to **Section 9.2.1.6** for further details and results).

3.2 SAMPLING SCHEDULE

The sampling program schedule for the Audit is summarised in **Table 3.1.** As shown in **Table 3.1**, there are several key sampling locations at the Woodlawn Facility. This includes:

- The Bioreactor;
- ED3N System;
- ED3S System;
- The LTP;
- ED1 Coffer Dam; and
- The MBT Facility.

The sampling program schedule includes all key sources requested in *Condition 7 (e) of Schedule 4 in the Specific Environmental Conditions - Landfill site* with the following exceptions:

- **Leachate recirculation***:* Since the 2012 IOA, the Audit has been unable to observe and thus collect representative samples for this scenario. Since the completion of EA 2010, Veolia has developed a leachate recirculation system that involves direct injection of leachate into the waste, which eliminates the need

for spraying over the surface (refer to **Section 9.2.1.1.1**). The Audit understands that this will continue to remain normal practice. Therefore, no suitable access points for the collection of odour samples from this source is – and will continue to be – possible. Notwithstanding this, as previously mentioned in **Section 2.3.2**, there is only a main reinjection infrastructure being maintained in the Bioreactor as a contingency/back-up option for leachate management when the leachate transfer system experiences any failure. This is supplemented by an additional reinjection point for operational contingency and providing no more than a day to enable repair/remedial works to be completed of the main reinjection point (refer to **Section 2.3.2.1**). Therefore, the use of leachate recirculation technique is not used extensively as part of the normal operation of the Bioreactor. On this basis, it is not considered to be a significant source of odour. Subsequent IOAs will continue to assess the circumstances relating to leachate recirculation within the Void and document any variation in leachate recirculation practices as required.

3.2.1 Wet Weather Conditions

The Woodlawn Facility encountered significant wet weather conditions in the days leading up to and during the Audit visit period. As a result, the Audit was able to collect odour samples under wet weather conditions and observed the effects of wet weather regarding the need to handle inundating levels of leachate and stormwater catchment in the Void.

3.2.2 Crisps Creek Intermodal Facility

No samples were collected from the IMF as all waste transportation is a fully contained process until the displacement of the contents into the Void via the mobile tipping platform. Instead, as per previous IOAs, an olfactory assessment (refer to **Section 9.2.1.11**) and FAOA survey monitoring program (refer to **Section 7**) was adopted to evaluate the odour performance of the IMF in the Audit.

3.2.2.1 Waste Container Management

The Audit notes that it is a requirement that all waste containers are to be designed, constructed, and maintained to prevent the emission of odour and be watertight to prevent the leakage of leachate from waste containers during transport and handling activities. This is a condition of consent for the Clyde Transfer Terminal Facility and Banksmeadow Transfer Terminal Facility, which is where the waste containerisation process occurs. As such, and as per previous IOAs, the Audit classifies the IMF as a very low-risk source regarding odour. Moreover, as per previous IOAs, there are virtually no active pathways for odour emission release from this operation that can be practically measured under normal operations. Therefore, and as will be discussed in **Section 9.2.1.10**, the IMF continues to be a negligible contributor to the Woodlawn Facility's overall operational odour emissions footprint under normal conditions.

Table 3.1 – The Audit sampling program schedule as conducted between 21 March 2022 and 24 March 2022		
Location	**Source Type^**	**No. of samples collected**
The Bioreactor		
ATF	Area source	3
Waste Covered Area	Area source	11
Leachate Treatment Dam		
LTD	Area source	2
ED3N Pond System		
ED3N1	Area source (2) + Liquid odour measurement (3)	5
ED3N2	Area source (2) + Liquid odour measurement (3)	5
ED3N3	Area source (2) + Liquid odour measurement (3)	5
ED3N4	Area source (2) + Liquid odour measurement (3)	5
ED3S Pond System		
ED3S2	Area source (2) + Liquid odour measurement (3)	5
ED1 Coffer Dam		
ED1 Coffer Dam	Area source (3) + Liquid odour measurement (3)	6
MBT Facility		
MBT Biofilter 1 System	Point source	4
MBT Biofilter 2 System	Point source	5
MBT Maturation Pad	Area source	10
LAP	Area source (4) + Liquid odour measurement (4)	8
TOTAL		**74**

^ refer to **Section 4** for details

4 SAMPLING METHODOLOGY

The sampling methodologies described in this section are associated with the 'Source Type' descriptions presented in **Section 3.2** - **Table 3.1**. Given the nature and characteristics of the emission sources sampled, the following sampling techniques are adopted in the Audit:

- Point source sampling, as detailed in **Section 4.1**;
- Area source sampling, as detailed in **Section 4.2**; and
- The Liquid Odour Method (LOM), as detailed in **Section 4.3**.

All odour sampling and testing completed in the Audit were undertaken in accordance with the NSW EPA guidelines and standards, including:

- NSW EPA document titled *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* dated January 2022 (the **NSW EPA Approved Methods**);
- NSW EPA document titled Technical Framework (and notes): Assessment and management of odour from stationary sources. Sydney: Department of Environment and Conservation, dated 2006;
- AS/NZS 4323.3 titled Stationary source emissions – Determination of odour concentration by dynamic olfactometry dated 2001 (**AS/NZS 4323.3**); and
- AS/NZS 4323.4 titled Stationary source emissions - Area source sampling - Flux chamber technique. Standards Australia dated 2009 (**AS/NZS 4323.4**).

The exception is the preparation of gas samples using the LOM. There is currently no guidance or standard for the LOM as it is an in-house technique developed by TOU (refer to **Section 4.3** for details).

4.1 POINT SOURCE SAMPLING METHOD

The method used for the collection of gas samples from the inlet and outlet locations of the biofilter systems at the MBT Facility involved the use of a point source sampling, consisting of the drum and pump method. This method involves the drawing of the sample air through a polytetrafluoroethylene (**PTFE**) sampling tube into a single-use, Nalophan sample bag. The bag was housed within a container (sampling drum) that was evacuated with a vacuum pump, and the sample collected by induced flow. The "lung method", by which this sampling procedure is known, allowed the sample air to be collected without encountering any potentially odorous material. **Figure 4.1** illustrates a schematic of the point source sampling method. This method is defined as OM-7 in the NSW EPA Approved Methods.

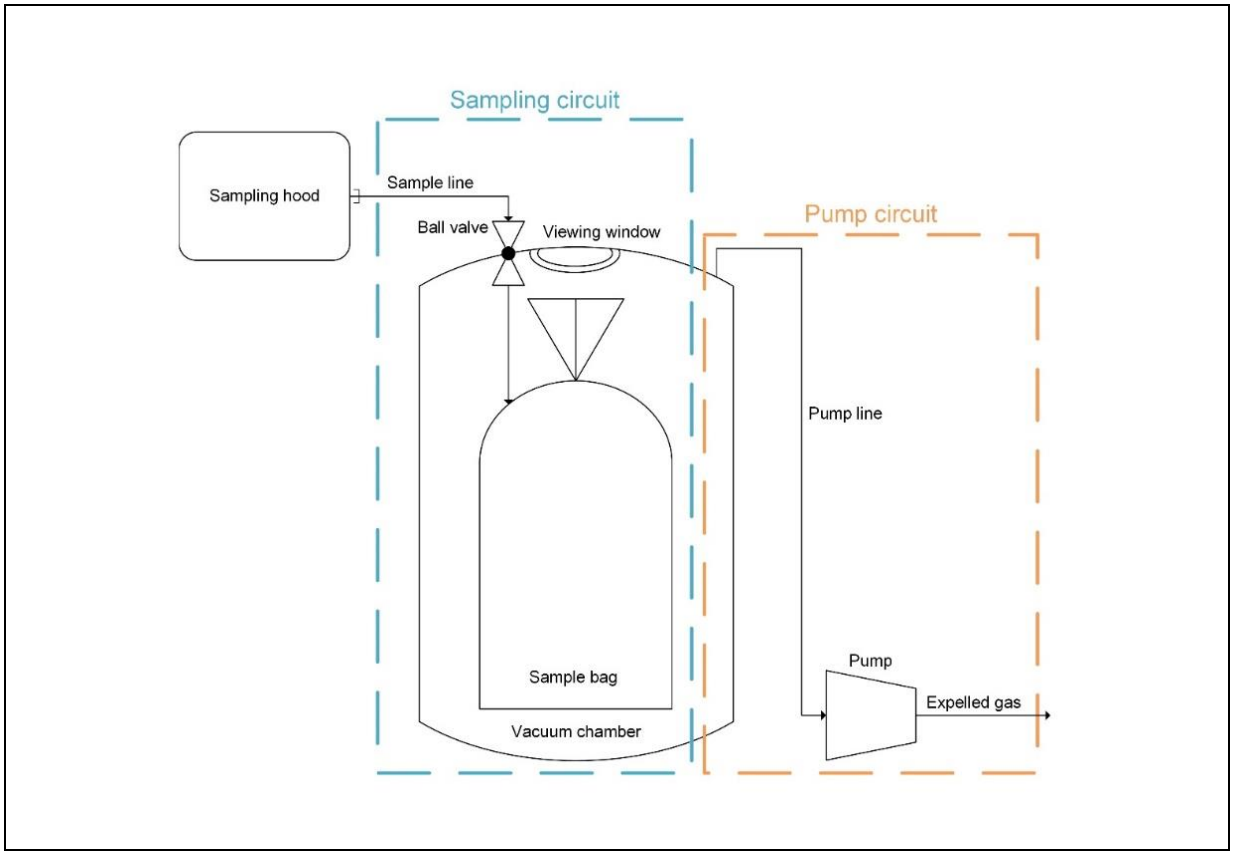


Figure 4.1 - Schematic of point source sampling

4.2 AREA SOURCE SAMPLING METHOD

The objective of the area source sampling was to collect representative odour samples from both solid and liquid surface areas at the Woodlawn Facility. This was undertaken using an isolation flux hood (**IFH**). All sampling using the IFH was carried out according to the method described in the United States Environment Protection Agency (**US EPA**) technical report '*EPA/600/8-86/008*', from which AS/NZS 4323.4 is based upon and is defined as OM-8 in the NSW EPA Approved Methods.

TOU's IFH adheres to the design specifications, materials of construction and supporting equipment that the US EPA report '*EPA/600/8-86/008*' defines. The IFH has a diameter of 0.406 m, a chamber surface area of 0.126 square metres (**m^2**) and a chamber volume of 30 litres (**L**), equivalent to 0.03 cubic metres (**m^3**), when the skirt of the hood is inserted into the liquid or solid surface by the specified 25 millimetres (**mm**). Dry nitrogen is then introduced to the IFH at a sweep rate of 5 L/min.

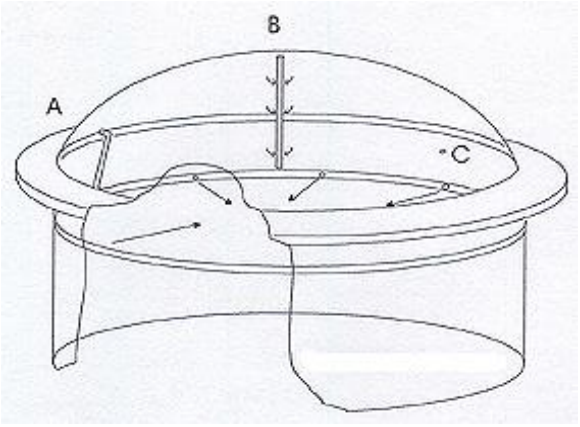
As these area sources are open to the atmosphere, wind is a major factor in the release of odorous pollutants from the surface and conveying the pollutant from the source to areas beyond the boundary. The IFH system is designed to simulate the transfer of odorous pollutants by the wind, resulting in a controlled and consistent sampling environment. This is achieved by the flux of near pure nitrogen gas into the IFH that is positioned on the liquid or solid surface. On a liquid surface, this is achieved by floating the IFH within an inflated tyre inner tube. The nitrogen gas then transports the odour from the surface in the same way the wind does, albeit at a very low sweep velocity. This odorous air is then collected for odour and/or chemical analysis.

As the IFH has a constant 5 L/min inflow of nitrogen gas to it, the sampling chamber remains under positive pressure and produces a net outflow through the vent on top of the IFH, therefore eliminating any chance of contamination of external air from the atmosphere. The IFH's volume of 30 L and the 5 L/min nitrogen sweep rate results in a gas residence time of six minutes. The US EPA method prescribes a minimum of four (4) air changes to achieve optimum purging and equilibrium in the hood, and therefore a total of 24 minutes is allowed before sampling commences. The sample is then collected over a 10-minute period to obtain a 20 L sample for odour and/or chemical analysis.

The method adopted by TOU is summarised as follows (and as described in the schematic of the sampling equipment shown in **Figure 4.2** and **Figure 4.3**)**:**

- Dry nitrogen is directed into the IFH via odour-free PTFE tubing until it has reached equilibrium. The nitrogen is channelled to a manifold fitted with small outlets above the surface, which direct the air towards the centre of the surface;
- The nitrogen flow (5 L/min) purges the flux hood with a residence time of four times the chamber volume occurring before sampling begins; and
- The odorous sample is drawn through a Teflon tube into a single-use, odour-free Nalophan sample bag secured inside a drum that is under vacuum. The balance of the gas flow is vented to the atmosphere.

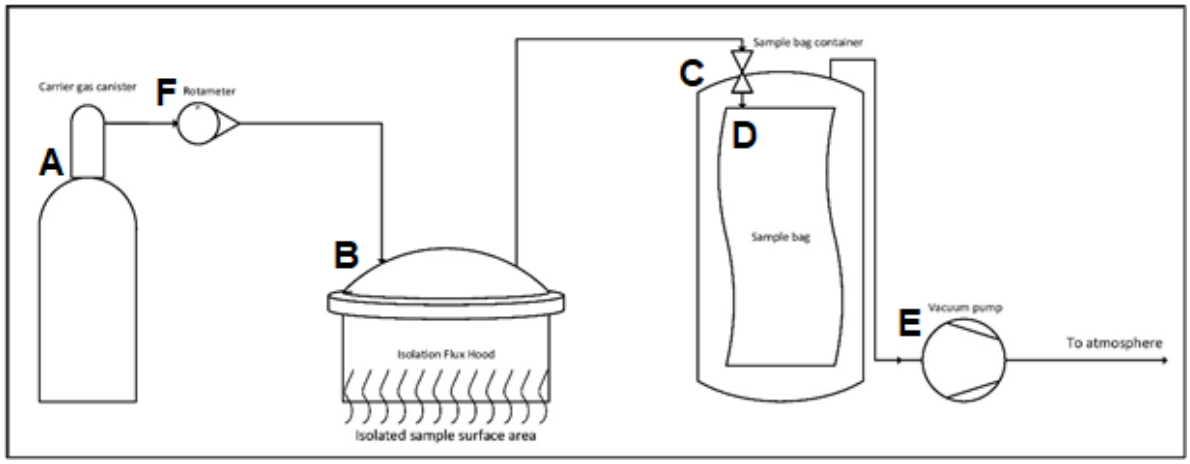
The IFH is manufactured from acrylic resin to ensure it does not contribute to the odour sample. All other surfaces in contact with the sample are made from PTFE or stainless steel. An example of IFH sampling on a solid surface and a liquid surface is shown in **Photo 4.1** and **Photo 4.2**, respectively.



Key

A	Inlet gas from the gas cylinder.
B	Outlet to sample bag.
C	Additional gas outlet points for other sampling, or temperature and moisture monitoring.

Figure 4.2 – Details of the isolation flux hood chamber



Key

A	Cylinder of nitrogen gas.
B	Isolation Flux Hood (a detailed diagram is shown in **Figure 4.2**)
C	Lung chamber (sampling drum)
D	Nalophan sampling bag
E	Sampling pump
F	Air flow meter

Figure 4.3 - Schematic of the isolation flux hood setup

Photo 4.1 - An example of IFH sampling on a solid surface (Maturation Pad Stockpile at the MBT Facility) as occurred on 24 March 2022

Photo 4.2 - An example of IFH sampling on a liquid surface (ED3N-2) as occurred on 21 March 2022

4.3 LIQUID ODOUR METHOD

4.3.1 Overview

The LOM was developed by TOU for measurement of the odour release potential from process liquors, which is universally applicable to aqueous solutions containing odorous substances. In simple terms, it measures the odour released when an odorous liquid evaporates. It is directly relevant to the mechanical evaporation units in use at the Woodlawn Facility and natural evaporation processes for volume reduction of treated leachate (refer to **Appendix D** for details on methodology).

4.4 PHYSICAL MEASUREMENTS

A series of measurements were collected at the MBT Facility to evaluates the physical performance of the biofilter system. This data facilitated in the contextualisation of the odour testing results from the biofilter system. The physical measurement parameters of the inlet airstream flowing to the biofilter system as collected in the Audit included airflow, inlet duct pressure, and temperature/moisture content. The measurement details are provided in **Section 4.4.1**, **Section 4.4.2**, and **Section 4.4.3**, respectively.

4.4.1 Airflow Measurements

The airflow measurements from the biofilter inlet were recorded by inserting a hot-wire anemometer into a pre-drilled hole in ductwork for Biofilter System 1 and Biofilter System 2 at the MBT Facility. The collection of these airflows was necessary to enable an Odour Emission Rate (**OER**) to be calculated (refer to **Table 6.3**).

4.4.2 Duct Pressure Measurements

The biofilter system inlet duct pressure was measured at the same location used for flow measurement, as in **Section 4.4.2**. Pressure was measured using a digital manometer and reported as the differential pressure between the duct pressure and atmospheric pressure. The measurements were recorded in Pascals (**Pa**).

4.4.3 Temperature and Relative Humidity Measurements

Relative humidity (**RH**) was measured using a two-channel digital thermometer, using Type K thermocouple probes. One probe was equipped as a wet-bulb thermometer, with the other a dry bulb probe. RH and moisture readings were calculated using a psychrometric chart. The RH/moisture level of the inlet airstream to the biofilter system is considered critical to achieving sustainable and effective performance. The Biofilter Manual specifics that a relative humidity target of 85% or higher is necessary for sustainable and effective biofilter system performance.

5 ODOUR MEASUREMENT DETERMINATION METHOD

5.1 ODOUR MEASUREMENT LABORATORY

All samples collected for the Audit were tested at TOU's NATA Accredited Odour Laboratory in Mascot, New South Wales.

5.1.1 Odour Concentration Measurement

TOU's odour laboratory operates to the AS/NZS 4323.3, which prescribes a method for sample analysis that provides quality assurance/quality control and ensures a high degree of confidence in the accuracy, repeatability, and reproducibility of results.

The concentration of the gaseous odour samples was measured using a technique known as dynamic olfactometry. Dynamic olfactometry involves the repeated presentation of both a diluted gaseous odour sample and an odour-free air stream to a panel of qualified assessors through two adjacent ports on the olfactometer (known as the Odormat™). TOU utilises four to six trained assessors (or panellists) for sample analysis, with the results from four qualified panellists being the minimum allowed under the AS/NZS 4323.3.

The method for odour concentration analysis involves the odorous gas sample initially being diluted to the point where it cannot be detected by any member of the panel. The assessor's step- up to the olfactometer, in turn, takes a sniff from each port, then choose which port contains the odour and enters their response. At each stage of the testing process, the concentration of the odorous gas is systematically increased (doubled) and re-presented to the panellists. A round is completed when all assessors have correctly detected the presence of the odour with certainty. The odour is presented to the panel for three rounds and results taken from the latter two rounds, as stated in AS/NZS 4323.3.

The results obtained give an odour measurement measured regarding odour units (**ou**). One (1) ou is the concentration of odorous air that can be detected by 50% of members of an odour panel (persons chosen as representative of the average population sensitivity to odour). It is effectively the concentration of an odour at the detection threshold level. The odour concentration of a sample expressed in odour units is the number of times the sample must be diluted to elicit a physiological response (the detection threshold level) from a panel. For example, twenty (20) odour units would mean that the odour sample will need to be diluted 20 times for the concentration to be at the detection threshold level. This process is defined within AS/NZS 4323.3.

The odour units determined from olfactometry laboratory analysis can be subsequently multiplied by an emission rate or volumetric flow to obtain an OER or a specific odour emission rate (**SOER**) for area source samples collected using the IFH method (refer to **Section 4.1** & **Section 5.1.2**).

5.1.2 Specific Odour Emission Rate

For area source samples collected using the IFH method, the results from odour concentration testing, derived in odour units (refer to **Section 4.1** for details), is multiplied by an emission rate to obtain a SOER. SOER is a measure of odour released

from a representative point at a source. The SOER is multiplied by the area of the source to obtain the OER or the total odour released from each source, that is:

- SOER ($ou.m^3\,m^{-2}\,s^{-1}$) = OC × Q / A; and
- OER ($ou.m^3\,s^{-1}$) = SOER × area of source (m^2)

where:

- OC = odour concentration of compound from air in the chamber (ou)
- Q = sweep gas volumetric flow rate into chamber ($m^3\,s^{-1}$)
- A = sample source total surface area (m^2)

The SOER is presented in the units $ou.m^3/m^2.s$ as per convention, and as referred to in the document – Klenbusch, M.R., 1986. USEPA Report No. EPA/600/8-86/008 '*Measurement of gaseous emission rates from land surfaces using an emission isolation flux chamber, - Users Guide'*. The OER is presented in the units' $ou.m^3/s$ as referenced in the AS/NZS 4323.3.

5.1.3 Odour Measurement Accuracy

The repeatability and odour measurement accuracy of the Odormat™ is determined by its deviation from statistically reference values specified in AS/NZS 4323.3. This includes the calculation of instrumental repeatability (r), where r must be less than 0.477 to comply with the standard criterion for repeatability. Its accuracy (A) is also tested against the 95th percentile confidence interval, where A must be less than 0.217 to comply with the accuracy criterion as mentioned in the AS/NZS 4323.3. The Odormat™ V04 complied with all requirements set out in the AS/NZS 4323.3 (refer to **Appendix B** – Result sheets: *Repeatability and Accuracy*). The calibration gas used was 51.0 parts per million (**ppm**), by volume, n-butanol in nitrogen gas (**N_2**).

6 ODOUR TESTING RESULTS

The following section addresses the following audit requirement as outlined in **Section 1.2**, namely:

e. *Measure all key odour sources on-site including:*

   i. consideration of wet weather conditions providing all raw data used in this analysis;

   ii. *consideration of (but not limited to) all liquid storage area, active tipping faces, waste cover area, aged waste areas and recirculation of leachate onto waste in the Void*;

   iii. a comparison of the results of these measurements against the predictions in the EA.

All key odour sources at the Woodlawn Facility were measured in the Audit, with the results presented in several tables, as follows:

- **Table 6.1** summarises the odour emission results obtained from the Audit and compares the results against the EA 2010 predictions. As there are no EA 2010 predictions for the ED3S Pond System or ED1 Coffer Dam, the results are compared with the emissions data used in the odour modelling study titled *Proposed Addition of ED3S to Leachate Management System* and dated 30 May 2016 (the **LMS May 2016 Report**);

- **Table 6.2** summaries the global mean SOER results derived in the Audit and compares these results to those derived in the previous IOAs conducted between 2012 and 2021;

- **Table 6.3** summarises the MBT Facility biofilter system odour emission results;

- **Table 6.4** and **Table 6.5** summarises the odour emission results for the MBT Facility Maturation Storage Pad Area and LAP, respectively; and

- **Table 6.6** summarises the liquid odour measurement results (note: the mechanical evaporation rates for the LAP were not available to the Audit – refer to **Section 2.6.5** for details).

In **Table 9.5** of **Section 9.5,** a summary of the OERs from all sources amenable to quantitative measurements are provided. These sources have been ranked in descending order. The results in **Table 9.5** do not include potential gas pathways and other fugitive emission sources from the waste surface, due to the difficulty in assigning an appropriate emission area for these sources to calculate an OER derived from the SOER and the area. This was a similar constraint in the previous IOAs. As such, it continues to remain a focus of the Audit with respect to odour emission reduction and management from the Bioreactor operations.

Table 6.1 - The Audit odour emission testing results obtained between 21 March 2022 and 24 March 2022 compared with that adopted in EA 2010

Source	The Audit				EA 2010	
Sample Location	**TOU Sample Number**	**Odour Concentration (ou)**	**SOER ($ou.m^3/m^2.s$)**	**Odour Character**	**SOER Range ($ou.m^3/m^2.s$)**	**SOER Model Input ($ou.m^3/m^2.s$)**
Bioreactor (The Void)						
Active Tipping Face (ATF)						
ATF, less than 1 day old	SC22206	5,790	3.55	garbage, compost, fermented	1.0 – 7.3*	7.3 (wet fresh waste emission adopted)
ATF, 1 month old	SC22207	4,870	2.73	garbage, compost, fermented		
ATF, Exposed Waste Surface	SC22208	512	0.31	garbage		
Aged Waste	n/m**				0.5	
Waste Covered Area (WCA) – refer to Figure 6.2						
WCA near M09	SC22182	49	0.026	musty, dirty	0.1 - 0.2* (covered) 7.5 – 23.9*** (fugitive emissions)	0.2 (covered) 23.9*** (fugitive emissions)
WCA near J04	SC22183	41	0.022	musty, dirty		
WCA near J13	SC22184	49	0.026	musty, dirty		
WCA near M12	SC22185	45	0.024	musty, dirty		
WCA near J18	SC22186	128	0.068	sweet ester, garbage		
WCA near H18	SC22187	128	0.070	sweet ester, garbage		
WCA near F10	SC22188	64	0.034	sweet ester, garbage		
WCA near F12	SC22189	64	0.034	sweet ester, garbage		
J07 - J08	SC22190	49	0.024	sweet ester, garbage		
K07 - K08	SC22191	76	0.037	sweet ester, garbage		
Biocover (NE Corner)	SC22192	54	0.031	sweet ester, garbage		

***** includes dry and wet covered waste
** unable to be sampled in the Audit due to access and safety concerns prevailing at the time
*** represents potential gas pathways
n/m = not measured

Table 6.1 (continued) - The Audit odour emission testings results obtained between 21 March 2022 and 24 March 2022 compared with that adopted in EA 2010

Source	The Audit				EA 2010	
Sample Location	**TOU Sample Number**	**Odour Concentration (ou)**	**SOER ($ou.m^3/m^2.s$)**	**Odour Character**	**SOER Range ($ou.m^3/m^2.s$)**	**SOER Model Input ($ou.m^3/m^2.s$)**
Bioreactor (The Void)						
Leachate Treatment Dam						
Leachate Treatment Dam (Aerated Zone)	SC22175	609	0.343	rotten egg, garbage	0.1 - 7.4*	3.6
Leachate Treatment Dam (Anoxic Zone)	SC22174	861	0.486	rotten egg, faecal		
Leachate recirculation system						
Leachate recirculation system	n/m				1.6 – 2.5	2.5
Landfill Gas Extraction System						
Landfill gas inlet	n/m				n/a	
Catchment Pond (leachate)^^						
Storage Pond 7	n/m				2.1 – 8.8	8.8
Catchment Pond (stormwater)^^						
Storage Pond 3 (Stormwater)	n/m				n/a	

* includes partially / fully treated leachate (dependent on the treatment stage of the process at the time samples were collected)
n/m = not measured
n/a = not applicable
^^ no longer in use

Table 6.1 (continued) - The Audit odour emission testings results obtained between 21 March 2022 and 24 March 2022 compared with that adopted in EA 2010

Source	The Audit				EA 2010	
Sample Location	**TOU Sample Number**	**Odour Concentration (ou)**	**SOER ($ou.m^3/m^2.s$)**	**Odour character**	**SOER Range ($ou.m^3/m^2.s$)**	**SOER Model Input ($ou.m^3/m^2.s$)**
Evaporation Dams						
ED3N Pond System						
ED3N1	SC22179	6,890	3.62	rotten egg, faecal	2.1 – 8.8	8.8
	SC22178	2,900	1.52	rotten egg, faecal		
ED3N2	SC22177	5,310	2.77	rotten egg, faecal	0.1 – 7.4	0.2*
	SC22176	1,220	0.667	rotten egg		
ED3N3	SC22172	45	0.025	dirty, muddy		
	SC22170	83	0.045	dirty, muddy		
ED3N4	SC22167	83	0.045	sour, garbage	0.1 – 0.7	0.7**
	SC22169	83	0.045	garbage, pungent, sweet		
ED3S Pond System						
ED3S1	n/m				0.0 - 0.5	0.5
ED3S2	SC22180	108	0.0571	rotten egg, pungent	0.159***	
	SC22181	91	0.0481	musty, dirty		
LTP System						
ED1 Coffer	SC22173	99	0.056	dirty, muddy	n/a	
	SC22168	45	0.027	garbage		
	SC22171	49	0.029	musty, stagnant, dirty		

* partially / fully treated leachate
** includes groundwater and fully treated leachate
*** not obtained from the EA. Source of emission data is the LMS May 2016 Report: Table 2.1
n/a = not applicable
n/m = not measured
n/d = not determined

Table 6.2 – Global mean SOER results: Comparison between the Audit and previous IOAs

Source	The Audit	2020 IOA	2019 IOA	2018 IOA	2017 IOA	2016 IOA	2015 IOA	2014 IOA	2013 IOA
Location	**TOU SOER ($ou.m^3/m^2.s$)**								
ED3N-1	2.57	n/a (empty)	n/a (empty)	0.356	0.132	0.130	0.132	0.017	0.30
ED3N-2 & 3^	0.877	0.361	0.0745	0.102	0.129	0.175	0.118	0.049	11.6 ^^^^
ED3N-2	1.72	0.0867	0.0881	0.169	0.120	0.148	0.145	0.066	20.1 ^^^
ED3N-3	0.0349	0.635	0.0609	0.035	0.139	0.20	0.091	0.032	0.2
ED3N-4	0.045	0.522	0.0856	0.095	0.163	0.248	0.269	0.023	0.0604
Active Tipping Face	2.20	3.24	5.26	7.59	9.52	8.16	7.51^^^^^	4.28	3.04
Leachate Treatment Dam	0.415	3.07	9.19	0.186	0.243	0.27	0.276	0.026	0.323
Construction and Demolition Tip Face	n/a	n/a	n/a	n/a	n/a	n/m	0.326	n/a	0.293
ED3S1	n/m	n/m	0.094	0.058	0.116	0.277	n/a	n/a	n/a
ED3S2	0.0526	2.19	0.554	0.13	1.97	0.437	n/a	n/a	n/a
Stormwater Pond 3^^	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Storage Pond 7^^	n/a	n/a	n/a	n/a	n/a	n/a	n/m^^	n/a#	n/a#
Source	**The Audit**	**2012 IOA**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
Location	**TOU SOER ($ou.m^3/m^2.s$)**								
ED3N-1	2.57	394	--	--	--	--	--	--	--
ED3N-2 & 3^	0.877	0.29	--	--	--	--	--	--	--
ED3N-2	1.72	0.21	--	--	--	--	--	--	--
ED3N-3	0.0349	0.37	--	--	--	--	--	--	--
ED3N-4	0.045	0.41	--	--	--	--	--	--	--
Active Tipping Face	2.20	8.36	--	--	--	--	--	--	--
Leachate Treatment Dam	0.415	0.46	--	--	--	--	--	--	--
Construction and Demolition Tip Face	n/a	n/a	--	--	--	--	--	--	--
ED3S	n/m	n/a	--	--	--	--	--	--	--
ED3S2	0.0526	n/a	--	--	--	--	--	--	--
Stormwater Pond 3^^	n/a	n/a	--	--	--	--	--	--	--
Storage Pond 7^^	n/a	85	--	--	--	--	--	--	--

^ as specified in the EA 2010
^^ no longer exists
^^^ represents the sub-optimal pond contents that have now been treated (see **IOA 2013 Report** for details)
^^^^ bulk of emissions originating from ED3N-2 (see **IOA 2013 Report** for details)
^^^^^ includes testing results reflecting sampled areas with the polymer slurry applied
# There was no designated area for this location (see **IOA 2014 Report** for details)
n/a = not applicable
n/m = not measured

Table 6.3 – MBT Facility: Biofilter System Results: 21 March 2022 and 24 March 2022

Sample Location		TOU Sample Number	Odour Concentration (ou)	Odour Emission Rate (ou.m³/s)	Odour character	Inlet Airflow (m³/h, actual)
MBT Biofilter 1						
MBT Biofilter 1	Western Cell Section (Composite)	SC22193	2,440	15,100	dirt, soil, garbage	--
	Middle Cell Section (Composite)	SC22194	2,050	12,700	dirt, soil, garbage	
	Eastern Cell Section (Composite)	SC22195	2,050	12,700	dirt, soil, garbage	
	Common Inlet	SC22201	4,470	83,300	garbage	80,000
MBT Biofilter 2						
MBT Biofilter 2	Southeast Cell Section (Composite)	SC22196	235	1,900	dirt, soil	--
	Northeast Cell Section (Composite)	SC22197	108	875	dirt, soil	
	Northwest Cell Section (Composite)	SC22198	215	1,740	dirt, soil	
	Southwest Cell Section (Composite)	SC22199	166	1,350	dirt, soil	
	Common Inlet	SC22200	790	25,600	garbage, compost	144,000

Table 6.4 – MBT Facility: Maturation Storage Pad Area Results: 21 March 2022 and 24 March 2022

Age (days)	Sample Location	TOU Sample Number	Odour Concentration (ou)	SOER (ou.m³/m².s)	Odour character
MBT Maturation Storage Area					
61	Area 1, Location 3, Maturation Pad	SC22209	332	0.20	compost, nutty
50	Area 1, Location 6, Maturation Pad	SC22210	664	0.401	compost, nutty
40	Area 2, Location 3, Maturation Pad	SC22211	332	0.2	compost, nutty
30	Area 2, Location 6, Maturation Pad	SC22212	181	0.112	compost, nutty
23	Area 2, Location 10, Maturation Pad	SC22213	304	0.169	compost, nutty
16	Area 3, Location 1, Maturation Pad	SC22214	279	0.159	compost, nutty
12	Area 3, location 2, Maturation Pad	SC22215	558	0.31	compost, nutty, garbage
2	Area 3, Location 4, Maturation Pad	SC22216	13,800	7.67	compost, nutty, garbage
23	FOGO Stockpile, greater than 4 weeks old, Shredded	SC22217	128	0.0812	garbage, compost
37	FOGO Stockpile, 2 weeks old, Shredded	SC22218	181	0.114	garbage, compost

Table 6.5 – MBT Facility: Leachate Aeration Pond Results: 21 March 2022 and 24 March 2022

Sample Location	TOU Sample Number	Odour Concentration (ou)	SOER (ou.m³/m².s)	Odour character
LAP				
Sample 27 Leachate Aeration Pond (Aeration - West)	SC22202	16,400	9.48	rendering, ammonia, pungent
Sample 28 Leachate Aeration Pond (Aeration - East)	SC22203	6,890	3.89	rendering, ammonia, pungent
Sample 29 Leachate Aeration Pond (Evaporation - West)	SC22204	6,890	3.99	rendering, ammonia, pungent
Sample 30 Leachate Aeration Pond (Evaporation - East)	SC22205	8,930	5.05	rendering, ammonia, pungent

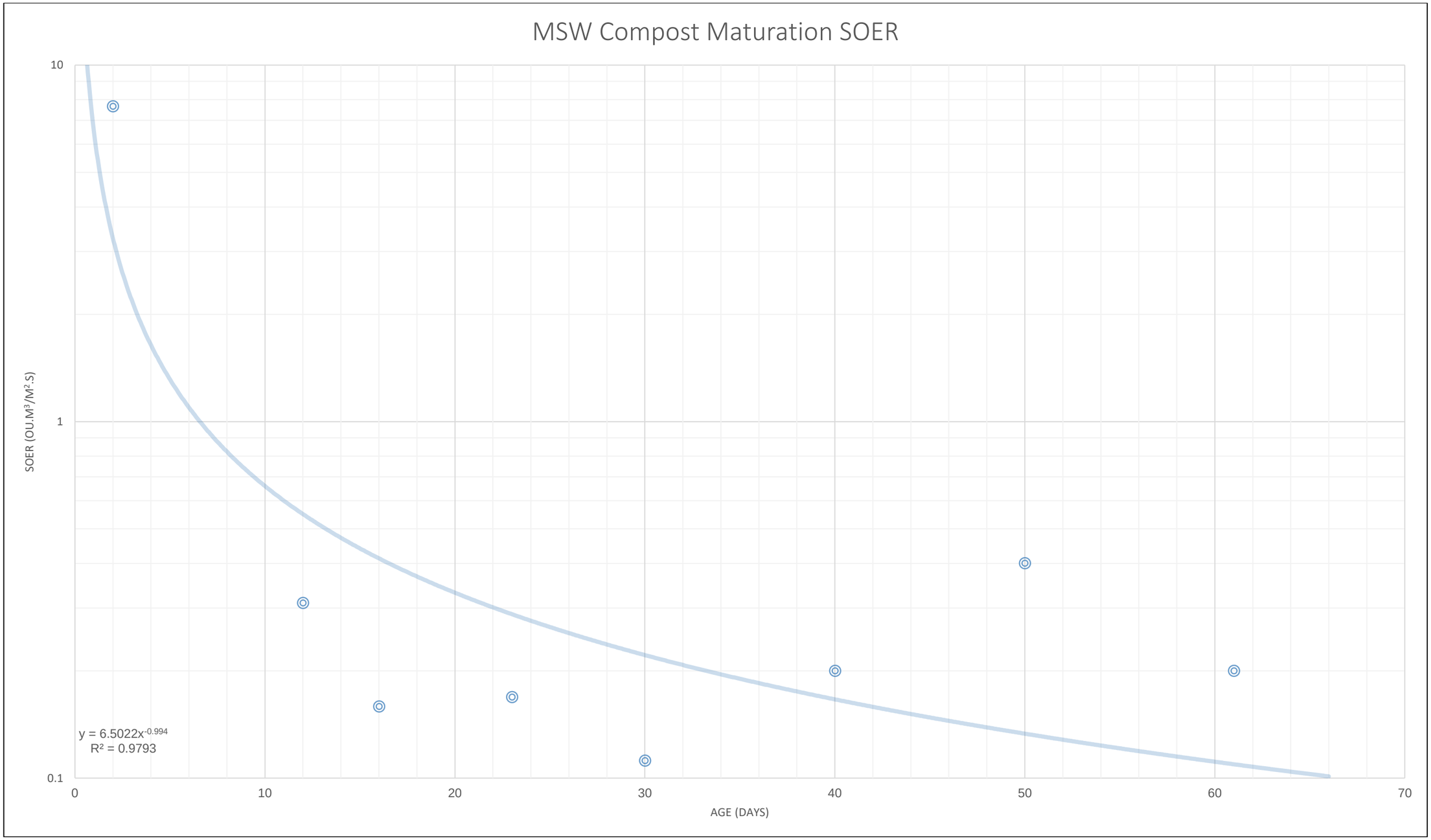


Figure 6.1 – MSW Compost Maturation SOER Trend Analysis

Table 6.6 – LOM derived odour emission rates for mechanical and natural evaporation methods: As collected on 24 March 2022 ^^^^

Sample Location	TOU Sample Number	Odour Concentration (ou)	Calculated Liquid Odour Potential (ou/mL)	Mechanical Evaporation Rate (L/min) per evaporator^ η = 20% / 30%	Mechanical Evaporation Mean Odour Emission Rate (ou.m³/s) per evaporator η = 20% / 30%	Mechanical Evaporation Mean Odour Emission Rate (ou.m³/s) ALL evaporators^^^ η = 20% / 30%
Evaporation method: Mechanical						
ED3N1	SC22240	140	8.47	45 / 70	System A is not used for ED3N1, ED3N2 and ED3N3, refer to **Section 2.4.2.1.1**. The OER for the surface spray evaporators has not been quantified in the Audit, as their contribution is considered negligible in the context of other on-site emission sources.	
	SC22241	108	6.54			
	SC22242	128	7.75			
ED3N2	SC22237	128	7.75			
	SC22238	118	7.14			
	SC22239	108	6.54			
ED3N3	SC22229	16	0.969			
	SC22230	23	1.39			
	SC22228	19	1.15			
ED3N4	SC22225	59	3.57		1,420 / 2,210	5,690 / 8,850
	SC22226	16	0.969			
	SC22227	19	1.15			
Evaporation method: Natural						
Sample Location	**TOU Sample Number**	**Odour Concentration (ou)**	**Calculated Liquid Odour Potential (ou/mL)**	**Current Surface Area (m²)**	**Natural Evaporation rate (mm/month) ^^**	**Natural Evaporation – Mean Odour Emission Rate (ou.m³/s)**
ED3S2	SC22222	118	7.14	22,100	92.67	5,410
	SC22223	108	6.54			
	SC22224	118	7.14			
ED1 Coffer Dam	SC22219	29	1.76	64,700		2,810
	SC22220	16	0.969			
	SC22221	16	0.969			
ED3N1	SC22240	140	8.47	1,440		384
	SC22241	108	6.54			
	SC22242	128	7.75			
ED3N2	SC22237	128	7.75	7,260		1,830
	SC22238	118	7.14			
	SC22239	108	6.54			
ED3N3	SC22229	16	0.969	6,760		279
	SC22230	23	1.39			
	SC22228	19	1.15			
ED3N4	SC22225	59	3.57	39,600		2,640
	SC22226	16	0.969			
	SC22227	19	1.15			

^ Mechanical evaporation rate is based on 20% / 30% evaporation efficiency per evaporator.
^^ The natural evaporation rate is based on the mean evaporation rate recorded between May 2007 to June 2012, refer to **Appendix C**.
^^^ Based on four active and identical evaporators as is the current mode of operation, at an operating performance of 225L/min.
^^^^Surface spray & ring main evaporation systems not included in calculation.

6.1 COMMENTS ON RESULTS

The following sections comment on the results presented in **Table 6.1**, **Table 6.2**, **Table 6.3**, **Table 6.4**, and **Table 6.6**.

6.1.1 The Void Samples

The following comments are made based on the Void samples collected in the Audit:

- The sampling locations inside the Void have been nominally shown in **Figure 6.2**. The sample numbers presented in **Figure 6.2** correspond with those in the sampling location column in **Table 6.1**. The conditions prevailing in the Void at the time of the Audit is presented in **Photo 6.1**;

- As presented in **Table 6.2**, the mean SOER results for the ATF (SC22206 – SC22208) in the Audit is 2.2 ou.m^3/m^2.s, representing a slight decrease since the previous 2020 IOA (3.2 ou.m^3/m^2.s). The odour character of the active tipping face samples collected in the Audit was reported as 'garbage, compost, fermented', representing a similar finding from previous IOAs. Based on previous IOA results for this source, this variation is considered to reflect normal variation from the ATF activity inside the Void; and

- The WCA samples (SC22182 – SC22192) were collected from covered areas across the Void surface profile at strategic locations designed to provide a representative quantification of the general emissions from the Void at the time of sampling. This includes:

    - Intermediate cover and capped area;

    - Known problematic fugitive emission pathway at the north-eastern corner of the Void perimeter covered with biocover material (SC22192)

    - Leachate pooling covered with biocover material (SC22190-SC22191); and

    - Spatial and visual variability across the surface profile.

- The SOER results are low (less than 0.1 ou.m^3/m^2.s) and suggest fugitive emission release and cover condition at the sampled locations were effective at the time.

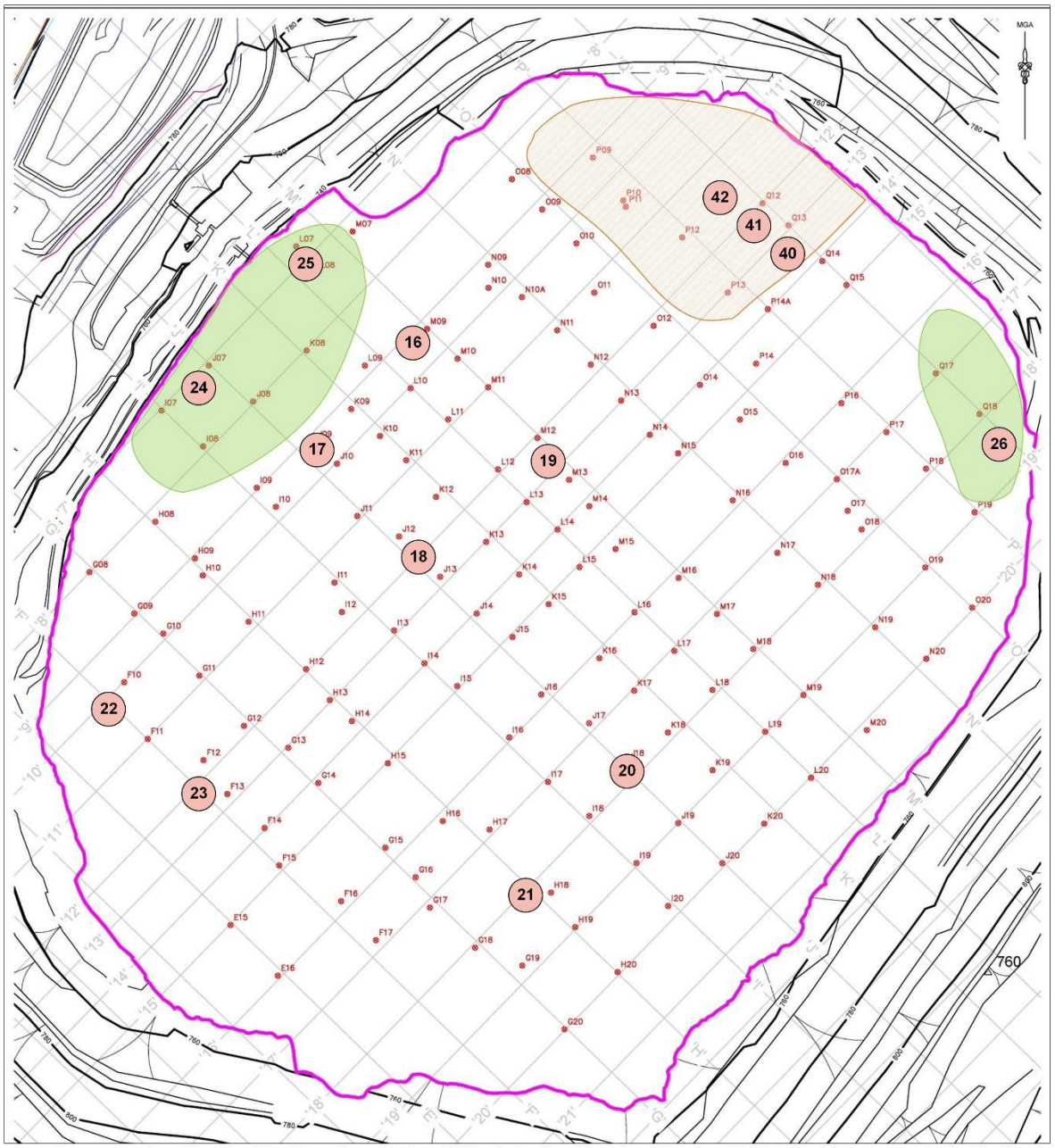


Image reproduced from the Woodlawn Bioreactor Landfill Monitoring Bore Locations (**Drawing 16700-245**) which was supplied by Veolia

Legend

- Sample location and number
- Active tipping face as found during the Audt
- Biocover as found during the Audt

Figure 6.2 - Nominal sampling locations within the Void: 22 March 2022

Photo 6.1 – Conditions prevailing in the Void during the Audit on 22 March 2022

6.1.2 Pond Source Samples – ED3N Pond System

The following comments are made based on the ED3N Pond System samples collected in the Audit:

- All samples from the ED3N system were collected from the bank of the dams. The nominal sampling locations are shown in **Figure 6.3**;
- All samples collected and tested from the ED3N Pond system (including SC22167, SC22169-SC22170, SC22172, SC22177-SC22179) were found to be below the EA 2010 SOER model inputs for each dam, with the exception of an individual result for ED3N-2 at 0.667 ou.m^3/m^2.s (SC22176);
- The SOER for ED3N-1 represents a higher than historical average when compared to results obtained in previous IOAs, although within the EA 2010 SOER model inputs (noting that ED3N-1 was empty in the previous 2020 IOA). As such, the treated leachate quality stored in ED3N-1 should be closely monitored and managed; and
- Notwithstanding the qualification made above, the results for ED3N Pond System indicate that the leachate treatment quality continues to be optimum and that the LMS at the Woodlawn Facility is performing well from an odour emissions viewpoint.

6.1.3 Pond Source Samples – ED3S1 Pond System

The following comments are made based on the ED3S1 Pond System samples collected in the Audit:

- No leachate is stored in ED3S Pond System. As such, this source was not sampled as it represents a stormwater dam and has been consistently shown in previous IOAs to be a negligible source at the Woodlawn Facility. This may change if this area is converted to a wet weather contingency dam for stormwater diversion during high rainfall periods (refer to **Section 3.2.1**).

6.1.4 Pond Source Samples – ED3S2 Pond System

The following comments are made based on the ED3S2 Pond System samples collected in the Audit:

- The SOER input from the LMS May 2016 Report used a SOER of 0.159 ou.m^3/m^2.s for the modelling of ED3S2. The mean result derived from the Audit is 0.0526 ou/m^3/m^2.s (refer to **Table 6.2**). This result is below the modelled input value and is unlikely to cause any adverse impact beyond the boundary of the Woodlawn Facility (despite the reported odour characters for the samples).

6.1.5 ED1 Coffer Dam Samples

The following comments are made based on the ED1 Coffer Dam samples collected in the Audit:

- A mentioned in **Section 2.4.6**, given the current water level height, it was possible during the Audit to gain safe access to ED1 coffer dam to enable odour sampling and testing via area source sampling; and

- The SOER results for ED1 Coffer dam were consistent with treated leachate quality that is low in odour and that stored in ED3S2 (0.159 ou.m^3/m^2.s. This is a positive result.

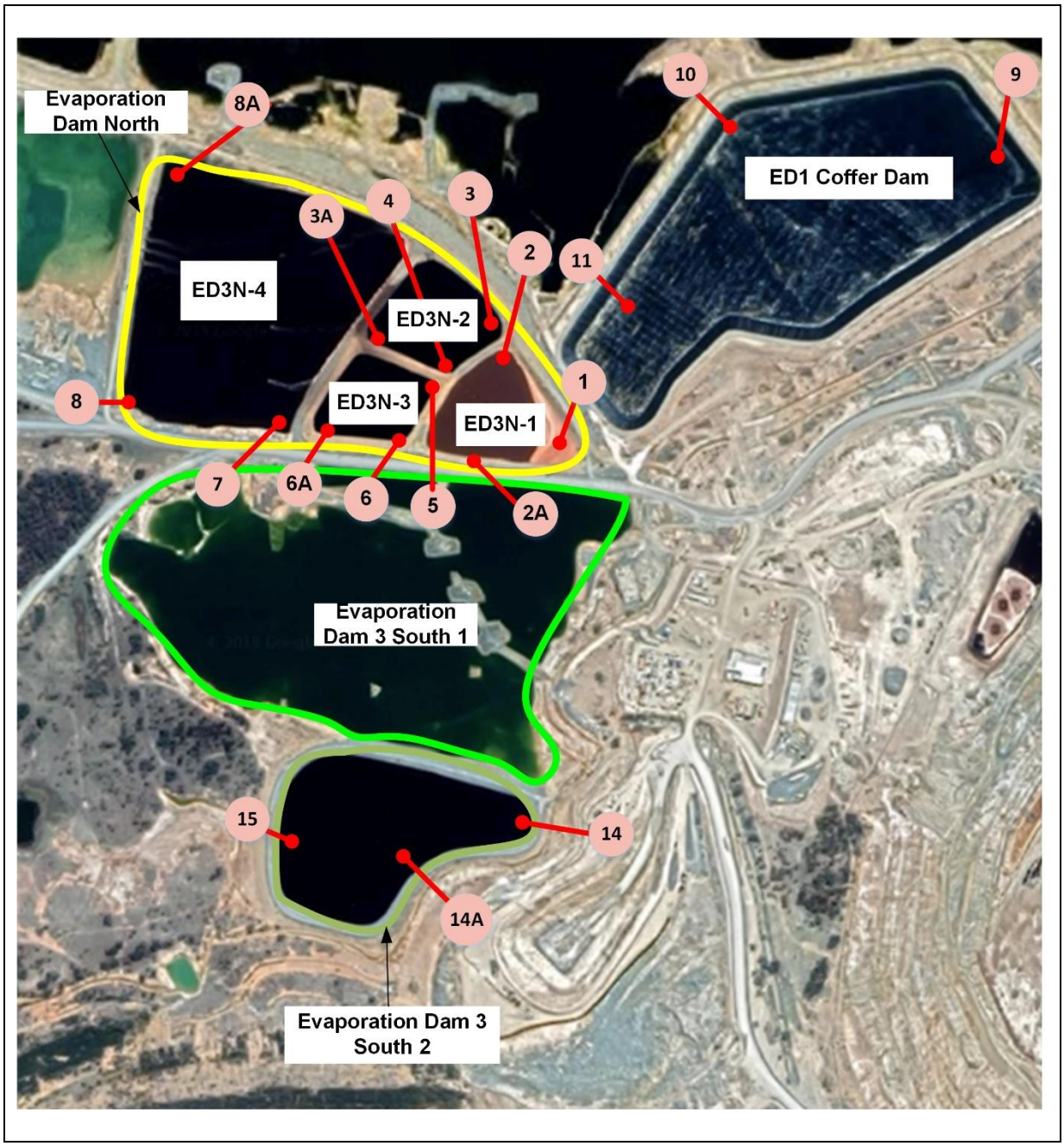


Figure 6.3 – Pond sources nominal liquid & gas sampling locations: 21 & 22 March 2022

6.1.6 Leachate Treatment Dam Samples

The following comments are made based on the LTD samples collected in the Audit:

- The LTD was found to be operating under normal operating conditions at the time of the Audit. There are clearly now two treatment zones in the LTD, including an anoxic zone and an aerobic zone. Both zones were sampled as part of the Audit; and

- The mean SOER result derived in the Audit for the LTD is 0.415 ou.m^3/m^2.s, representing a decrease since the previous IOA (3.1 ou.m^3/m^2.s). This value is below the EA 2010 SOER value of 3.6 ou.m^3/m^2.s for the LTD and consistent with optimum performance.

6.1.7 Landfill Gas Samples

The following comments are made based on the landfill gas samples collected in the Audit:

- The Audit determined that it was not necessary to collect an inlet landfill gas sample to the Void based on the testing carried out during the 2021 Emissions Testing Report and 2022 Emissions Testing Report (refer to **Appendix C**).

6.1.8 Liquid Odour Measurement Samples

The following comments are made based on the liquid samples collected in the Audit:

The liquid odour measurement results represent the odour that would be released if the sample were evaporated, either by natural or mechanical means. For the Audit, mechanical and natural evaporation has been used in the calculations. The natural evaporation rate shown is based on the mean rate at the Woodlawn Facility between May 2007 to June 2012;

- An extensive number of liquid samples were collected from ED3N-1, ED3N-2, ED3N-3, ED3N-4, ED3S2 and ED1 coffer dam in the Audit. As such, the dataset obtained in the Audit provides a good level of confidence in relation to the leachate quality and odour potential when evaporated;

- The natural evaporation OERs across ED3N, ED3S2 and ED1 Coffer Dam fall within historical trends from previous IOAs; and

- All collected liquid samples analysed via the LOM method were found to be low in odour, but 'ammoniacal, pungent, musty, sour' odour characters were recorded for some samples, with others indicating only a 'musty' odour character. Typically, a 'musty or muddy water' odour character is typically a reliable indicator of optimum pond health and minimal odour release conditions from a treated leachate dam, even at high OERs (i.e., the odour emission is of a treated quality odour). As such, the quality of treated leachate in ED3N, ED3S2, and ED1 Coffer Dam is considered to pose a minimal odour risk at the Woodlawn Facility and supports the field ambient odour assessment survey data (refer to **Section 7**);

- Overall, the liquid sample results are consistent with previous IOAs and very unlikely to be problematical with respect to off-site impacts. This outcome is consistent with the results from the collected gas samples from the area source sampling (refer to **Section 6.1.2**). The implication of this result is discussed in **Section 9.2.1.6**; and

- The liquid samples from ED1 Coffer Dam indicate that the LTP was performing in an optimum condition at the time of the Audit, despite being in the process-proving phase.

6.1.9 MBT Facility

The following comments are made based on the MBT Facility samples collected in the Audit:

Biofilter System

- The odour testing results for the Biofilter 1 System indicated a higher inlet odour emission rate compared to the previous 2020 IOA (27,000 ou.m^3/s to 83,300 ou.m^3/s). This is likely reflective of the operating conditions prevailing at the time. The biofilter outlet results were above the desirable performance target of 1,000 ou or less. At the time of sampling, Biofilter 1 System bed moisture and inlet relative humidity levels were low and further optimisation is required to improve performance. The effect of these operating circumstances has meant that the biofilter outlet emissions are higher than the desirable target or the outlet character continues to consist of the inlet character;

- The odour testing results for the Biofilter 2 System indicated a significantly lower inlet odour emission rate compared to the previous 2020 IOA (231,000 ou.m^3/s to 25,600 ou.m^3/s). This is likely reflective of the operating conditions prevailing at the time. The Biofilter 2 System outlet results were below the desirable performance target of 1,000 ou and contained none of the inlet process character (garbage, compost) – this is a good outcome; and

- The OERs are based on the measured inlet airflows to Biofilter System 1 and Biofilter System 2, i.e., 80,000 m^3/hr and 144,000 m^3/hr, respectively. These airflows are within the design airflow limit of 81,200 m^3/hr and 175,500 m^3/hr for Biofilter System 1 and Biofilter System 2, respectively (refer to **Section 2.6.3**).

MBT Maturation Pad

- The samples from the MBT Maturation Pad were collected to represent the age profile of the stockpile material present at the time; and

- The SOER range was between 0.15 – 0.3 ou.m^3/m^2.s and reflect the quality of the stockpile material sampled at the time (except for SC22216 that retuned a value of 7.67 ou.m^3/m^2.s). This range is modestly comparable to the previous IOA and reflects the potential variability in the externally stored stockpile material at any given time.

LAP

- The LAP was found to have an average SOER of 5.6 ou.m^3/m^2.s, with all samples reporting a ‘rendering, ammonia, pungent’ odour character.

7 FIELD AMBIENT ODOUR ASSESSMENT SURVEY

A series of FAOA surveys were conducted as part of the Audit. It is understood that the completion of these FAOA surveys was required at specific times over the course of the Audit, as requested by NSW EPA. Specifically, the FAOA surveys were required to be undertaken during the following time periods:

- Before 0730 hrs;
- Midday; and
- After 2100 hrs.

The FAOA surveys are beneficial in assessing any potential fugitive emission release from the Bioreactor operations and its impact off-site, particularly when conducted during these hours. The FAOA were conducted over the period between 21 March 2022 and 22 March 2022. All surveys were carried out by calibrated and experienced TOU field assessors. The following section summarises the methodology and results from the FAOA surveys conducted as part of the Audit.

7.1 FAOA SURVEY SCHEDULE

The FAOA survey schedule undertaken for the Audit is summarised in **Table 7.1**.

Table 7.1 – FAOA survey schedule as completed in the Audit

FAOA Survey Session No.	Survey Date	Survey Time
1 of 3	21 March 2022	Evening, 2133 hrs – 2224 hrs
2 of 3	22 March 2022	Morning, 0633 hrs – 0759 hrs
3 of 3	22 March 2022	Midday, 1214 hrs – 1355 hrs

7.1.1 FAOA Survey Operating Conditions

The operating conditions prevailing during each FAOA survey session conducted as part of the Audit were as follows:

- Before 0730 hrs (on 21 March 2022):
  - **Bioreactor**: ATF covered, tipping operations offline, mechanical evaporation operations offline, and LMS (including LTP and LTD) and landfill gas extraction online and operating under normal conditions; and
  - **MBT Facility**: no tipping in either the Reception Building or Organic Buffer Storage Building. The LAP is online and operating under normal conditions. All ingress and egress to process buildings are closed.
- Midday (on 22 March 2022):
  - **Bioreactor**: ATF covered, tipping operations active, mechanical evaporation operations active, and LMS (including LTP and LTD) and landfill gas extraction online and operating under normal conditions; and

- **MBT Facility**: no tipping in either the Reception Building or Organic Buffer Storage Building. The LAP is online and operating under normal conditions. All ingress and egress to process buildings are being actively used.

- After 2100 hrs (on 22 March 2022):

  - **Bioreactor**: ATF covered, tipping operations offline, mechanical evaporation operations offline, and LMS (including LTP and LTD) and landfill gas extraction online and operating under normal conditions; and

  - **MBT Facility**: no tipping in either the Reception Building or Organic Buffer Storage Building. The LAP is online and operating under normal conditions. All ingress and egress to process buildings are closed.

7.2 PREAMBLE

At present, no Australian Standard exists for FAOA surveys. Consequently, TOU utilises a method for assessing the ground-level impacts of odour emissions using a modified version of the German Standard VDI 3940 (1993) – '*Determination of Odorants in Ambient Air by Field Inspections'*. This standard prescribes the methods by which field technicians (or assessors) determine, define and document observed ground level odours and the manner in which the determination of these odours is defined in relation to odour character, the frequency of odours observed and the odour intensity of those individual observations as a quantitative scale of measure.

FAOA surveys are considered a valuable odour impact assessment tool as previous experience with ambient odour sampling and subsequent olfactometry testing suggests that accurate and useful ambient odour concentration data is difficult to obtain. This limitation also applies to the adoption of dispersion modelling where there are limitations associated with the practical quantification of all operational emission sources or accidental odour emission release events triggered by upset/atypical scenarios. This ultimately impacts the quality of input emissions data and practical confidence of the modelling predictions (this is of significance to the Audit as documented in **Section 9.4**). Therefore, TOU has adopted a more practical approach based on field ambient odour surveillance measurement surveys. With this method, calibrated and experienced odour assessor/s traverse the general area and downwind surrounds of odour sources in a strategically mapped pattern, assessing the presence, character and intensity of any odours encountered and recording these observations along with wind speed and direction (when applicable). For the FAOA surveys conducted at the Woodlawn Facility, all accessible downwind areas were assessed. The assessed areas were based on the wind conditions prevailing at the time of the FAOA Survey.

7.3 FAOA SURVEY MEASUREMENTS METHODOLOGY

The FAOA Survey measurement methodology as adopted in the Audit is consistent with the guidance provided in the NSW EPA document titled *Guide to conducting field odour surveys* dated June 2022 (the **NSW EPA Odour Guide**). To that end, the techniques employed in the FAOA surveys conducted during the Audit were able to quantify and/or qualify the following:

- Odour intensity:
- Odour character;
- Frequency;
- Extent of odour plume; and
- Likely source of odours detected near and far-field from the Woodlawn Facility.

For the surveys undertaken at the Woodlawn Facility, each TOU assessor spent five minutes at each Measurement Location Point (**MLP**) in order to gauge the effects of any odour impact. Each measurement cycle comprised of thirty (30) individual 'grab' assessments of odour, one every ten seconds for a single measurement cycle of five minutes (representing a truncated measurement interval provided in the NSW EPA Odour Guide – this was undertaken in the interest of enhancing downwind spatial coverage given the limited time period and distance between each MLP). When plotted each grab measurement resulted in a single data point.

Overall, each survey utilised one or two assessors, with each assessor undertaking measurements over the assessment area at different MLPs over the duration of each survey session. The derived results of the surveys were then illustrated visually on odour impact maps.

At each MLP, wind velocity and direction was checked using a vane anemometer. In the event of a positive detection of odour at an MLP, the TOU assessor attempted to evaluate the odour intensity, odour character and likely source (whenever possible). In this way, the FAOA method enables the determination and extent of the impact of odour around the area of interest, rank their intensity and likely source.

7.3.1 Odour Intensity Categories

The ranking scale for the observed off-site odours detected beyond the facility boundary was quantified according to the *German Standard VDI 3940 'Determination of Odorants in Ambient Air by Field Inspections'.* The standard's ranking system is based on the following seven (7)-point intensity scale, as shown in **Table 7.2**.

The MLP assigned an odour intensity score of '0' (not detectable) were still be recorded in order to outline the presence and extent of the odour present at the MLP. The 'distinct' level is that at which the odour character (e.g. bin juice, fermented garbage, putrid) is clearly definable.

Table 7.2 - VDI 3882 (Part 1) odour intensity categories		
Odour Strength	**Intensity Rank (code)**	**TOU Interpretation (meaning)**
Not detectable	0	No odour detected
Very Weak	1	Odour is barely recognisable by someone specifically looking for the odour and is unlikely to be detected at other times
Weak	2	Odour is weak with character and able to be determined with some effort
Distinct	3	Odour is clearly evident and its character is easily identifiable
Strong	4	Odour is strong and readily detectable
Very Strong	5	Odour is very strong
Extremely Strong	6	Odour is extremely strong. This level of odour is more likely to be encountered at its source/site boundary rather than at downwind locations.

7.3.2 Odour Intensity and Frequency Criterion

Although outside the scope of work for the Audit, and referring to the Odour Intensity Categories listed and described in **Table 7.2** above, a particular odour intensity level can often be linked to a possible odour impact from an assessed facility. This criterion, whether it is Category 2 (Weak) or Category 3 (Distinct), will be dependent upon the sensitivity of the receptor areas, the nature/offensiveness of the odours present, and the frequency of exposure. Odour Intensity Category 1 (very weak) would rarely, if ever, correspond to adverse odour impacts.

As previously mentioned in **Section 7.3**, the FAOA surveys conducted downwind of the Woodlawn Facility resulted in two assessors generating thirty (30) sniffs per measurement cycle per MLP. From this, the data was benchmarked against a suitable frequency impact criterion of 10%, i.e. a positive detection of an odour is measured for more than or equal to 10% of the time (equivalent to three (3) sniffs over five (5) minutes) during the measurement cycle at an odour intensity of 1 or greater. This criterion was selected based on previous FAOA studies conducted by TOU and considered to be the event in which adverse odour impact is likely given the sensitivity of the receiving environment (i.e., the Tarago township).

7.3.3 FAOA Key Odour Descriptors

The odour sources at the Woodlawn Facility originate from the processes occurring in each key area, such as the Void, LMS, and MBT Facility. Based on TOU's extensive experience at the Woodlawn Facility, key odour descriptors were allocated and subsequently standardised to represent the quality of odours detected within the

assessed area. The odour descriptors used in the surveys enabled the characterisation of the detected odour/s and determination of likely source by strategically undertaking the surveys upwind, downwind and closer to the Woodlawn Facility boundary, when required.

The definition for each odour character/descriptor used in the FAOA surveys are as follows:

- Odour character A – vegetative matter;
- Odour character B – sour, vomit (butyric acid), garbage;
- Odour character C – landfill gas, sulphurous;
- Odour character D – sweet garbage, bin juice;
- Odour character E – pineapple, ester; and
- Odour character F – musty, stagnant water.

7.3.4 Survey Meteorological Conditions

Ideally, FAOA surveys should be carried out over a range of meteorological conditions, from near-calm to moderate to strong wind speeds, and under differing wind directions. The result of each FAOA survey would then determine the impact range within that assessment area for that survey, and the overall findings represent a broader picture of possible adverse odour impacts. For the FAOA Surveys conducted as part of the Audit, the focus was on the times of the day when calm to light winds is prevalent, i.e., early mornings and late evenings and cooler temperatures. These meteorological conditions are suspected to be the most problematic based on logged odour complaints.

The general prevailing local wind conditions at the time of conducting the FAOA surveys were broadly calm to moderate speeds with various wind directions encountered. The weather conditions were largely fine, with fog encountered on the morning of 22 March 2022.

7.3.5 Recording of Meteorological Conditions

The local meteorological conditions prevailing over the duration of the FAOA surveys were recorded using a Kestrel 4500 Pocket Weather Tracker Anemometer (refer to **Photo 7.1** for an illustrated setup). At each MLP assessed, the assessors would set up the anemometer apparatus enabling a grab measurement of wind speed and direction at an MLP. This was undertaken during every survey at each MLP.

Photo 7.1 - Illustrated setup of the Kestrel Anemometer apparatus in operation (**Source**: TOU)

7.3.6 Interpretation of Survey Findings

Each map plot result consists of several features. These are generally depicted on a pie chart and wind vane indicator on each map plot. The features include:

- **A measurement location point (MLP)**: these are strategic points on the map that were designed to enable assessors to pursue upwind and downwind effects from the Woodlawn Facility;

- **Location wind conditions**: the local wind direction and speed at each MLP have been indicated by a yellow arrow. In the event a wind direction has not been indicated, the conditions at the time were calm (i.e., < 0.5 m/s) and wind direction was unable to be accurately determined. The recorded wind conditions at each MLP may have varied at the time of the assessment from the prevailing wind conditions that existed in the general Tarago precinct recorded by local meteorological stations. Given the complex meteorological dynamics that can occur arising (such as local terrain, topography, katabatic channelling, and effects from natural and built environments) affecting wind direction and speed, the local wind conditions experienced at some MLP varied from the prevailing wind condition; and

- **Odour descriptors:** at each MLP where a measurement cycle is undertaken, key parameters are recorded where an odour is detected. The key descriptors shown on the maps include the intensity of odour (how strong the smell is) based on the VDI 3882 German Odour Intensity Scale. In addition, the odour character is also recorded based on an odour character inventory developed by TOU to describe the range of odours encountered throughout the course of the surveys.

7.4 FAOA SURVEY RESULTS

The FAOA survey results are presented on odour impact map plots, as follows:

- **FAOA Survey Map Plot 1** – Session 1 (Evening): 21 March 2022 between 2133 hrs and 2224 hrs. During this time, there were no waste tipping operations or transportation of waste containers;

- **FAOA Survey Map Plot 2** – Session 2 (Morning): 22 March 2022 between 0633 hrs and 0759 hrs. During this time, normal operations were occurring at the Bioreactor and MBT Facility; and

- **FAOA Survey Map Plot 3** – Session 3 (Midday): 22 March 2022 between 1214 hrs and 1355 hrs. During this time, normal operations were occurring at the Bioreactor and MBT Facility.

7.4.1 Commentary on FAOA Results

Based on the FAOA survey map plot results, the following comments are made:

- **FAOA Survey Map Plot 1:** Very weak (1) to distinct (3) 'vegetative matter' and 'sour, vomit (butyric acid), garbage' odours were intermittently detectable from a narrow plume crossing at Taylors Creek Road. The likely source was determined to be the Woodlawn Facility, likely from either the Bioreactor and/or MBT Facility operations;

- **FAOA Survey Map Plot 2**: Very weak (1) to distinct (3) 'sour, vomit (butyric acid), garbage', 'landfill gas, sulphurous', 'sweet garbage, bin juice' and 'pineapple, ester' odours were detectable along Bungendore Road and Collector Road, at the IMF, at Tarago and southbound along Braidwood Road. The likely source was determined to be the Woodlawn Facility, specifically the Bioreactor operations based on the detected odour markers; and

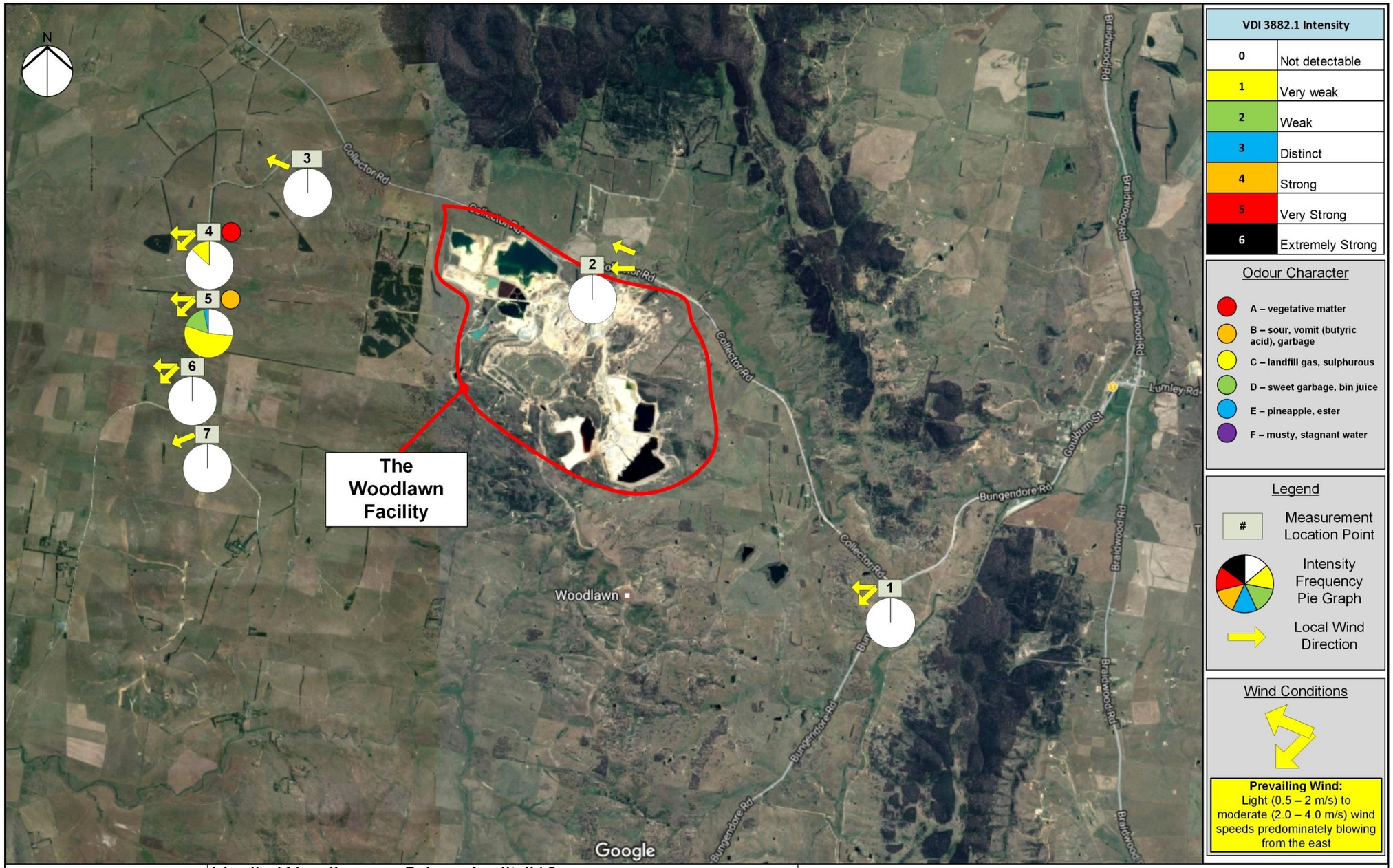
- **FAOA Survey Map Plot 3**: Very weak (1) to distinct (3) 'sour, vomit (butyric acid), garbage', 'sweet garbage, bin juice', and 'musty, stagnant water' odours were detected southeast bound along Collector Road from the Woodlawn Facility entrance. The likely source was the Woodlawn Facility, specifically the Bioreactor operations based on the detected odour markers. The 'musty, stagnant water' is not likely to be any significance given the Very Weak intensity, frequency and duration of detection and the localised nature of the plume (detectable at a single MLP at the time). This was likely coming from mechanical evaporators servicing the LMS.

With the above in mind, the FAOA survey findings appear to be inconsistent with the odour modelling predictions documented in **Section 8**. In view of the FAOA surveys and modelling analysis, it is likely that the sampled source areas found during the Audit were not adversely impacting nearby sensitive receptors to the Void and the Tarago Community. Instead, the observed impact found during the FAOA surveys is likely related to fugitive emission release from the Void surface (refer to **Section 9.2.1.12** and **Section 10.2.1** for further context). Furthermore, pond-related sources, including ED3N

Pond System, ED3S Pond System, LTD, LTP, ED1 Coffer Dam and the MBT Facility, were not detectable to any significant extent. Notably, the FAOA survey findings continue to be consistent with and support the derived odour emissions results found in the Audit, which continue to show that all pond sources at the Woodlawn Facility are unlikely to lead to off-site impacts under the current treatment and storage conditions.

7.4.2 FAOA Survey Concluding Remarks

Overall, the FAOA surveys identified odour that can be traced back to the Woodlawn Facility at modest distances in the Audit. The predominate odour types (Odour Character B, Odour Character C, and Odour Character D (i.e., 'sour, vomit (butyric acid), garbage', 'landfill gas, sulphurous', and 'sweet garbage, bin juice', respectively) that were detectable during the FAOA surveys under the prevailing operations were likely emanating from the Void surface and detectable at Very Weak (1) and Distinct (3) odour intensities Based on the derived odour measurements and extensive experience gained by the Audit team of the Woodlawn Facility (and at other landfill operations), this odour is likely related to fugitive gas emission pathways originating from the surface of the Void, which is judged to be the major contributor to the risk of odour emission release from the Void. This supports Veolia continued strategies as documented in the WIP 2020 and WIPS5 2022 (refer to **Section 10.2.1**) and previous audit recommendations promoting striving for operational excellence and continuous improvement in this area (particularly with respect to leachate and landfill gas extraction as well as stormwater diversion).

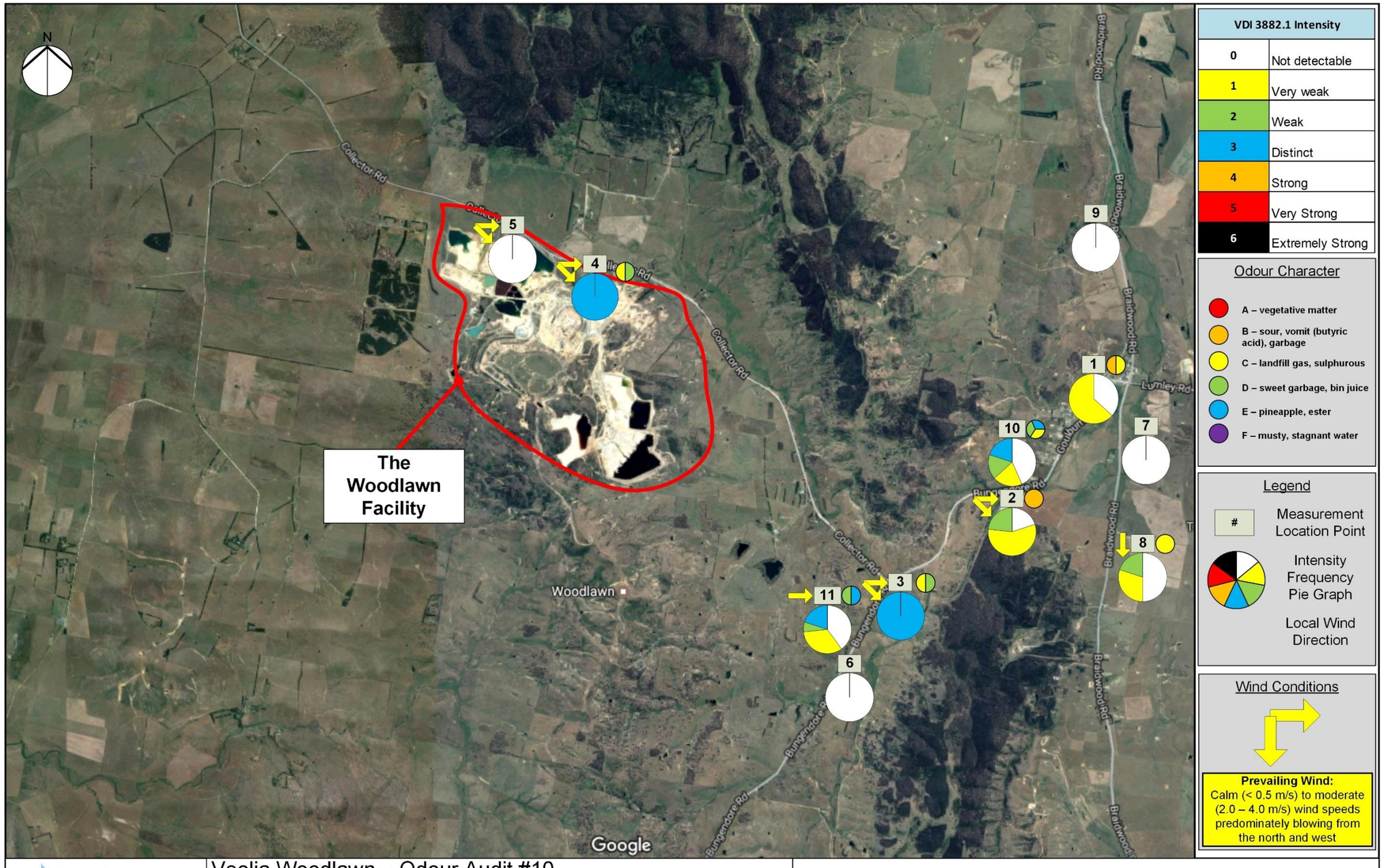


THE ODOUR UNIT

Veolia Woodlawn – Odour Audit #10
Field Ambient Odour Assessment
Survey Session #1 of 3 – Evening
Odour Impact Map

Field Ambient Odour Assessment Survey
Session Date: 21/03/2022 Session Time: 2133 hrs – 2224 hrs
Area: 1 Odour Impact Criterion: Intensity ≥ 1 Frequency ≥ 10%
Drawn By: I. Farrugia Revision: 1 Drawn Date: 06/04/2022

FAOA Survey Map Plot 1 – Session 1 (Evening): 21 March 2022 between 2133 hrs and 2224 hrs

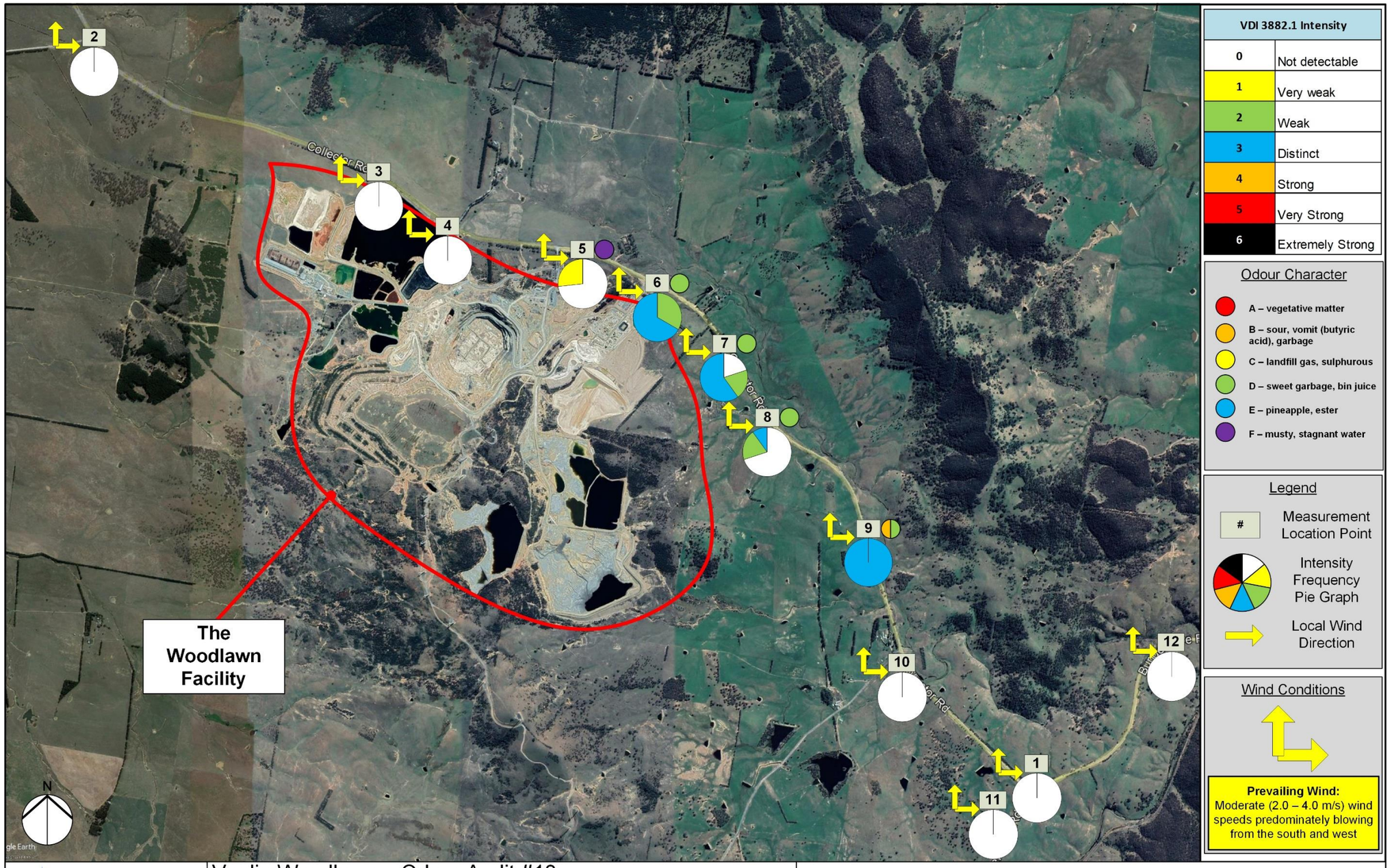


THE ODOUR UNIT

Veolia Woodlawn – Odour Audit #10
Field Ambient Odour Assessment
Survey Session #2 of 3 – Morning
Odour Impact Map

Field Ambient Odour Assessment Survey
Session Date: 22/03/2022 Session Time: 0633 hrs – 0759 hrs
Area: 1 Odour Impact Criterion: Intensity ≥ 1 Frequency ≥ 10%
Drawn By: I. Farrugia Revision: 1 Drawn Date: 06/04/2022

FAOA Survey Map Plot 2 – Session 2 (Morning): 22 March 2022 between 0633 hrs and 0759 hrs



FAOA Survey Map Plot 3 – Session 3 (Midday): 22 March 2022 between 1214 hrs and 1355 hrs

8 ODOUR MODELLING ANALYSIS

8.1 PREFACE

As part of the scope of work for the Audit, TOU was requested to deliver a re-run of the Woodlawn Facility-specific odour dispersion model initially done in the EA 2010 with the current operational factors and odour audit emissions data. As mentioned in **Section 9.4**, the purpose of the re-run is to demonstrate compliance with the modelling-based, project-specific odour performance goal of 6 ou and *Condition 7 (F)* of the Audit requirements.

8.1.1 Relevant Modelling Background Information

To enable the undertaking of the modelling re-run, TOU was supplied the original odour dispersion model used in the EA 2010 developed by the former Heggies Pty Ltd, now operating under SLR Consulting. TOU updated the original CALMET meteorology for its initial assessment of the addition of the ED3S dam to the leachate management system (refer to the LMS May 2016 Report). The preparation methodology has been reproduced in **Section 8.3**. The original configuration and odour emission rates can be found in *Section 5* of the EA 2010 titled *Odour and Dust Impact Assessment (Rev 5) Report* dated 2 August 2010 (the **Previous Model**).

8.1.2 Scope of Works

The scope of the Audit required the update of the previous IOA odour dispersion model with current operational factors and odour audit emissions data measured as part of the current IOA. This involved the modification and removal of odour sources from the previous IOA odour dispersion model to best represent the present operations during the Audit period. The following section details the methodology and findings of the odour modelling analysis as completed in the Audit for the Woodlawn Facility.

8.2 ODOUR DISPERSION MODELLING METHODOLOGY

8.2.1 Odour Emissions Testing Results Summary

The results of the odour emissions testing carried out for the Audit containing the source areas, SOERs and OERs are summarised in **Table 8.1.** The tabulated odour emission inventories for the EA and each of the annual odour audits, along with the individual sample results for the current and previous odour audits, can be provided upon request. The exclusion for the modelling exercise is as follows:

- The contribution of the spray evaporation system (as described in **Section 2.4.2.1**) and reported in **Table 6.6**. There is no evidence to suggest that mechanical spray evaporation is a problematical activity from an odour viewpoint, given the outcome of the LOM analysis undertaken in the Audit (refer to **Section 6.1.8**).

Table 8.1 – A summary of odour emissions data used in the modelling study				
Location	**Area (m^2)**	**SOER ($ou.m^3/m^2.s$)**	**OER ($ou.m^3/s$)**	**Comments**
ED3N1	1,440	2.57	3,691	Mean value of two (2) samples from the Audit
ED3N2 & 3	14,000	0.877	12,300	Mean value of four (4) samples from the Audit
ED3N4	39,600	0.0450	1,780	Mean value of two (2) samples from the Audit
ED3S1 (fm.ED3S)	71,500	0.0940	6,720	Not measured. Previous IOA data used.
ED3S2 (fm.ED3SS)	22,100	0.0526	1,160	Mean value if two (2) samples from the Audit
ED1 Coffer	64,700	0.0372	2,410	Mean value of three (3) samples from the Audit
Active Tipping Face	2,000	2.20	4,400	Mean value of three (3) samples from the Audit
Leachate Treatment Dam	3,970	0.415	1,650	Mean value of anoxic and aeration zone samples from the Audit
Waste Covered Area	159,000	0.0510	7,810	75^{th} percentile of 18 samples from previous IOA and the Audit
MBT Maturation Pad (MSW Area 1)	1,550	0.215	334	Five (5) out of seven (7) rows with MSW compost.
MBT Maturation Pad (MSW Area 2)	3,490	0.215	752	Ten (10) out of ten (10) rows with MSW compost.
MBT Maturation Pad (MSW Area 3)	1,400	2.16	3,030	Four (4) out of ten (10) rows with MSW compost.
MBT Maturation Pad (MSW Area 4)	--	--	--	No MSW compost was present in the area during the Audit.
MBT Maturation Pad (FOGO Area 5)	694	0.296	206	Two (2) out of ten (10) rows with FOGO compost.
MBT Maturation Pad (FOGO Area 6)	641	0.098	63	Two (2) out of seven (7) rows with FOGO compost.
MBT Leachate Aeration Pond	2,950	5.60	16,500	Mean value of four (4) samples from the Audit
MBT Biofilter 1	--	--	40,600	Sum of measured OER from three (3) samples
MBT Biofilter 2	--	--	5,870	Sum of measured OER from four (4) samples/

8.2.2 Odour Source and Emission Rate Configurations

The sources from the previous 2020 IOA model had their location and areas corrected (most by minor SOER adjustments), defunct sources were removed, and new sources were added to best represent the present operations reflected in the latest iteration of odour emissions testing for the Audit. The result is illustrated in **Figure 8.1**. It should be noted that odour sources from the MBT Facility and the LTP have been added to the Audit model, shown in **Figure 8.2** and **Figure 8.3**, respectively. The Audit model source areas and emission rates are provided in **Table 8.2**, respectively.

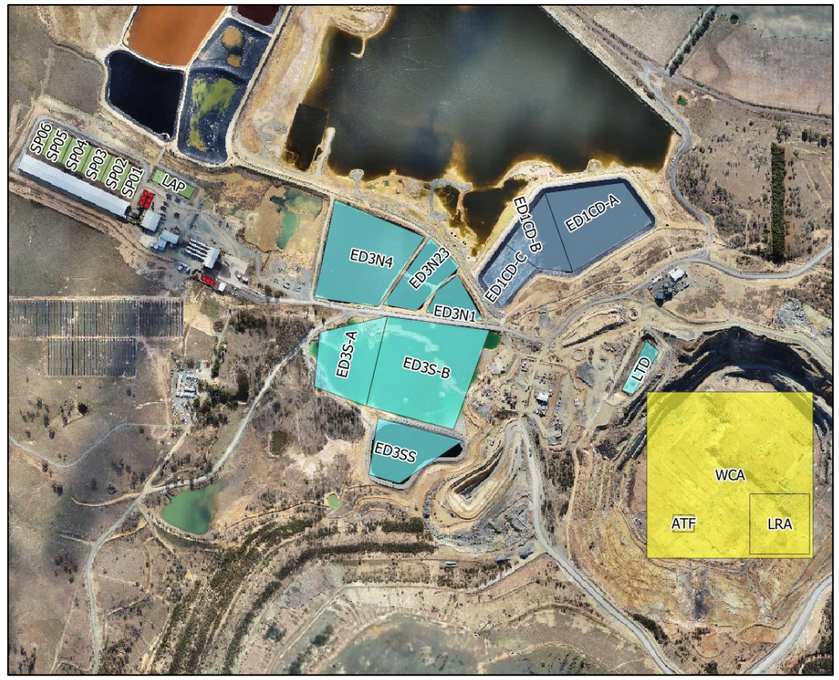


Figure 8.1 – Layout of modelled sources in the Audit

Figure 8.2 – Layout of modelled MBT sources in the Audit

Figure 8.3 – Layout of the modelled LTP sources in the Audit

Table 8.2 – The Audit model source areas and emission rates					
Source ID	**Description**	**Area (m^2)**	**SOER ($ou.m^3/m^2.s$)**	**OER ($ou.m^3/s$)**	**Comment**
Bioreactor and Leachate Evaporation System					
ATF	Active Tipping Face	2,000	2.20	4,400	None.
LRA	Leachate Recirculation Area (ceased)	--	--	--	Leachate recirculation ceased (WIP 2020).
WCA	Waste Covered Area (fugitives)	159,000	0.051	7,800	None.
ED3N1	Leachate Evaporation Dam 3 North 1	1,440	2.57	3,690	None.
ED3N23	Leachate Evaporation Dam 3 North 2 & 3	14,000	0.861	12,300	None.
ED3N4	Leachate Evaporation Dam 3 North 4	36,600	0.045	1,650	None.
ED3S	Leachate Evaporation Dam 3 South System (Sections A & B)	71,500	0.0940	6,720	Not measured during IOA. Last known measurement used.
ED3SS	Leachate Evaporation Dam 3 South-South System	22,100	0.0526	1,160	None.
LTD	Leachate Treatment Dam	3,990	0.395	1,650	None.
Sub-total OER				**39,400**	To three significant figures.
MBT Maturation Pad, Leachate and Biofilters					
LAP	Leachate Aeration Pond	2,950	5.6	16,500	None.
SP01	Area 1 MSW Maturation	2,180	0.154	334	Weighted mean – five (5) rows with MSW compost, two (2) empty rows.
SP02	Area 2 MSW Maturation	3,490	0.215	751	Weighted mean – ten (10) rows with MSW compost, no empty rows.
SP03	Area 3 MSW Maturation	3,500	0.864	3,030	Weighted mean – four (4) rows with MSW compost, six (6) empty rows.
SP04	Area 4 MSW Screening and Storage	--	--	--	No MSW compost present in area during the Audit.
SP05	Area 5 FOGO Maturation	3,470	0.059	205	Weighted mean – two (2) rows with FOGO compost, eight (8) empty rows.
SP06	Area 6 FOGO Screening and Storage	2,240	0.028	63	Weighted mean – two (2) rows with FOGO compost, five (5) empty rows.
BF1	Biofilter 1 (Cells 1, 2 & 3)	--	--	40,500	None.
BF2	Biofilter 2 (Cells 1, 2, 3, 4, 5 & 6)	--	--	5,870	None.
SUB-TOTAL OER				**67,300**	To three significant figures.
Leachate Treatment Plant					
BT1	Balance Tank 1	227	0.255	58	77 h residence time (Note 1)
AX1	Anoxic Tank 1	28	0.147	4	163 h residence time (Note 1)
AX2	Anoxic Tank 2	28	0.130	4	182 h residence time (Note 1)
AE1	Aeration Tank 1	141	0.0911	13	238 h residence time (Note 1)
AE2	Aeration Tank 2	141	0.0502	7	332 h residence time (Note 1)
ED1CD	ED1 Coffer Dam (Sections A, B & C)	64,700	0.0372	2,410	Sources moved to LTP group.
SUB-TOTAL OER				**2,500**	To three significant figures.
IOA #10 MODEL TOTAL OER				**109,000**	To three significant figures.

Note 1 - SOER of LTP process units in series estimated by exponential decay of measured SOER from LTD to ED1 Coffer Dam (ED1CD) as a function of residence time based on flowrate of 282 m3/d through the LTP as advised by Veolia.

8.3 ODOUR DISPERSION MODELLING METHODOLOGY

8.3.1 NSW Odour Criteria and Dispersion Model Guidelines

Regulatory authority guidelines for odorous impacts of gaseous process emissions are not designed to satisfy a 'zero odour impact criteria', but rather to minimise the nuisance effect to acceptable levels of these emissions to a large range of odour sensitive receptors within the local community.

The odour impact assessment for this project has been carried out in accordance with the methods outlined by the documents:

- NSW EPA titled Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales dated 2022;
- NSW EPA document titled Technical Framework (and notes): Assessment and management of odour from stationary sources. Sydney: Department of Environment and Conservation dated 2006; and
- Barclay & Scire, 2011. Generic Guidance and Optimum Model Settings for the CALPUFF Modeling System for Inclusion into the '*Approved Methods for the Modeling and Assessments of Air Pollutants in NSW, Australia'*.

The documents specify that the odour modelling for Level 3 impact assessments, upon which this study has been conducted, be based on the use of:

- The 99.0th percentile dispersion model predictions;
- 1-hour averaging times with built-in peak-to-mean ratios to adjust the averaging time to a 1-second nose-response-time;
- Odour emission rates multiplied by the peak-to-mean ratios as outlined in **Table 8.3**;
- The far-field distance is typically defined as greater than ten (10) times the largest source dimension, either height or width; and
- The appropriate odour impact assessment criterion (**IAC**), based on the population of the affected community near the development.

Table 8.3 – NSW EPA peak-to-mean factors			
Source type	**Pasquill-Gifford stability class**	**Near-field P/M60***	**Far-field P/M60***
Area	A, B, C, D	2.5	2.3
	E, F	2.3	1.9
Line	A-F	6	6
Surface wake-free point	A, B, C	12	4
	D, E, F	25	7
Tall wake-free point	A, B, C	17	3
	D, E, F	35	6
Wake-affected point	A-F	2.3	2.3
Volume	A-F	2.3	2.3

* Ratio of peak 1-second average concentrations to mean 1-hour average concentrations
Source: Environment Protection Authority, 2005 – Table 6.1

The IAC for complex mixtures of odours is designed to include receptors with a range of sensitivities. Therefore, a statistical approach is used to determine the acceptable ground level concentration of odour at the nearest sensitive receptor. This criterion is determined by the following equation:

$$IAC = \frac{\log_{10}(p) - 4.5}{-0.6}$$ **Equation 8.1**

where,

IAC = Impact Assessment Criteria (ou)
***p* =** population

Source: NSW EPA titled Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales dated 2022 – *Equation 7.1*

Based on **Equation 8.1**, **Table 8.4** outlines the odour performance criteria for six different affected population density categories. It states that higher odour concentrations are permitted in lower population density applications.

Table 8.4 – Odour IAC under various population densities	
Population of affected community	**Odour performance criterion (ou)**
Urban Area (≥ ~2000)	2.0
~500	3.0
~125	4.0
~30	5.0
~10	6.0
Single rural residence (≤ ~2)	7.0

Source: NSW EPA titled Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales dated 2022 – *Table 18*

The original odour impact assessment contained in the EA 2010 had adopted the IAC of **6 ou** "*given the low number of sensitive receptor locations in the vicinity of the Woodlawn site*". TOU has maintained consistency with this approach as conditions have not significantly changed.

8.3.2 Odour Dispersion Model Selection

The odour dispersion modelling assessment was carried out using the CALPUFF System (Version 7.2.1 Level: 150618). CALPUFF is a puff dispersion model that can simulate the effects of time- and space-varying meteorological conditions on pollutant transport. CALMET is a meteorological model that produces three-dimensional gridded wind and temperature fields to be fed into CALPUFF. The primary output from CALPUFF is hourly pollutant concentrations evaluated at gridded and/or discrete receptor locations. CALPOST/CALRANK processes the hourly pollutant concentration output to produce tables at each receptor and contour plots across the modelling domain. For further technical information about the CALPUFF modelling system, refer to the document *CALPUFF Modeling System Version 6 User Instructions*.

The CALPUFF system can account for a variety of effects such as non-steady-state meteorological conditions, complex terrain, varying land uses, plume fumigation and low wind speed dispersion. CALPUFF is considered an appropriate dispersion model for impact assessment by NSW EPA in their document - *Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in New South Wales* in one or more of the following applications:

- complex terrain, non-steady-state conditions;
- buoyant line plumes;
- coastal effects such as fumigation;
- high frequency of stable calm night-time conditions;
- high frequency of calm conditions; and
- inversion break-up fumigation conditions.

In the case of this odour modelling study in the Audit, CALPUFF was required to handle the complexity of surrounding terrain features. Under calm and very light winds, non-steady-state conditions such as accumulation of odour and/or downslope movement with drainage airflow would almost certainly occur.

For the odour modelling study in the Audit, the air contaminant was odour and ground-level concentrations in odour units (**ou**) have been projected.

8.3.3 Geophysical and Meteorological Configuration

A CALMET hybrid three-dimensional meteorological data file for Woodlawn was produced that incorporated of gridded numerical meteorological data supplemented by surface observation data, topography, and land use over the domain area.

8.3.4 Terrain Configuration

Terrain elevations were sourced from 1 Second Shuttle Radar Topography Mission (**SRTM**) Derived Smoothed Digital Elevation Model (**DEM-S**). The SRTM data was treated with several processes including but not limited to removal of stripes, void filling, tree offset removal and adaptive smoothing. The DEM-S was used as input into TERREL processor to produce 20 km by 20 km grid at 0.15 km resolution. A map of the terrain is illustrated in **Figure 8.4.**

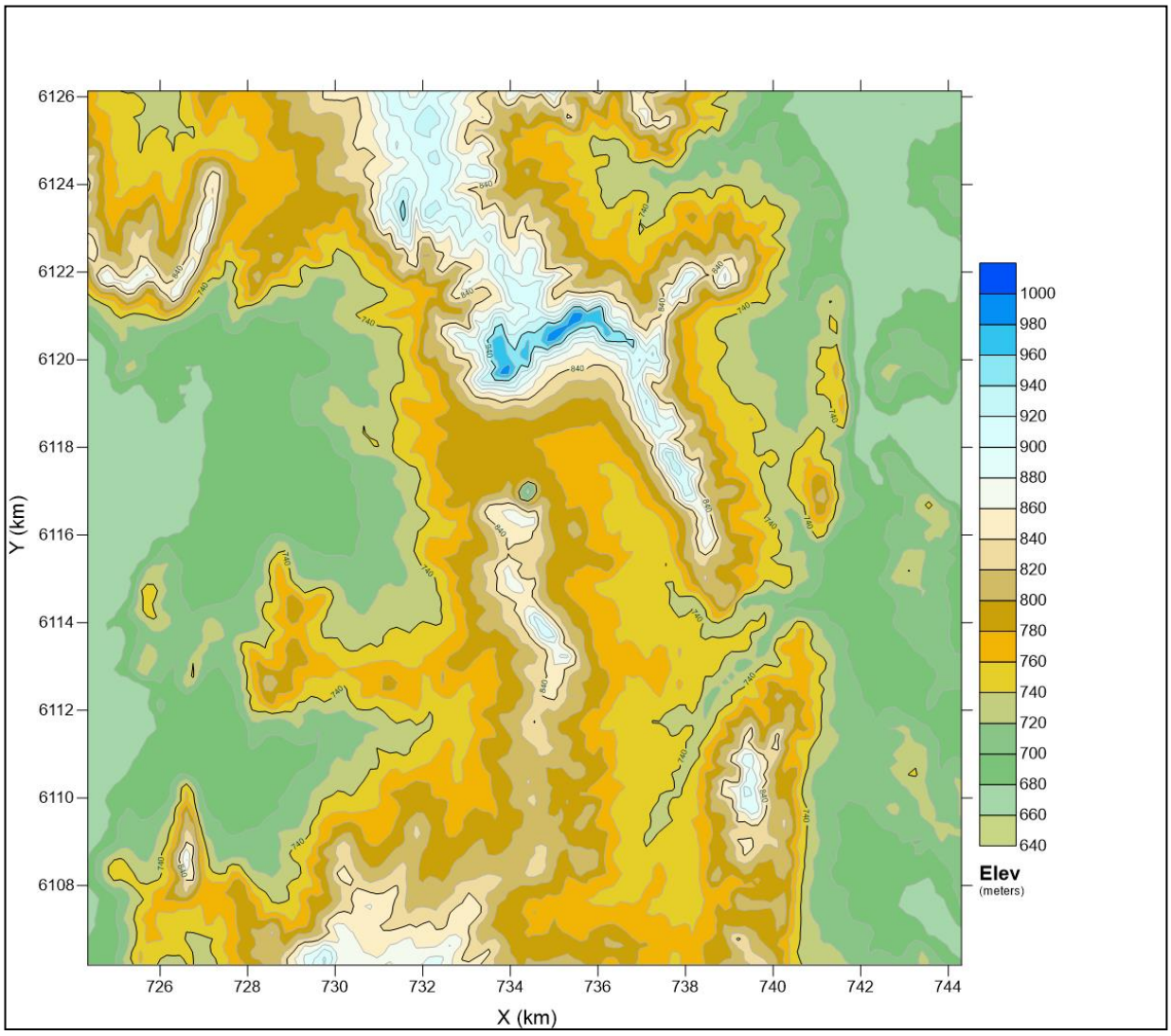


Figure 8.4 - Terrain map of Woodlawn and surrounds

8.3.5 Land Use Configuration

Land use was sourced from the United States Geological Survey (**USGS**) Global Land Cover Characteristics Data Base for the Australia-Pacific region. The data was used as input into CTGPROC processor to produce a 20 km by 20 km grid at 0.15 km resolution. A map of the land use is illustrated in **Figure 8.5**.

8.3.6 Geophysical Configuration

The geophysical data file was created using the MAKEGEO processor. Land use data from CTGPROC and terrain data from TERREL were used as input to produce a 20 km by 20 km geophysical grid at 0.15 km resolution.

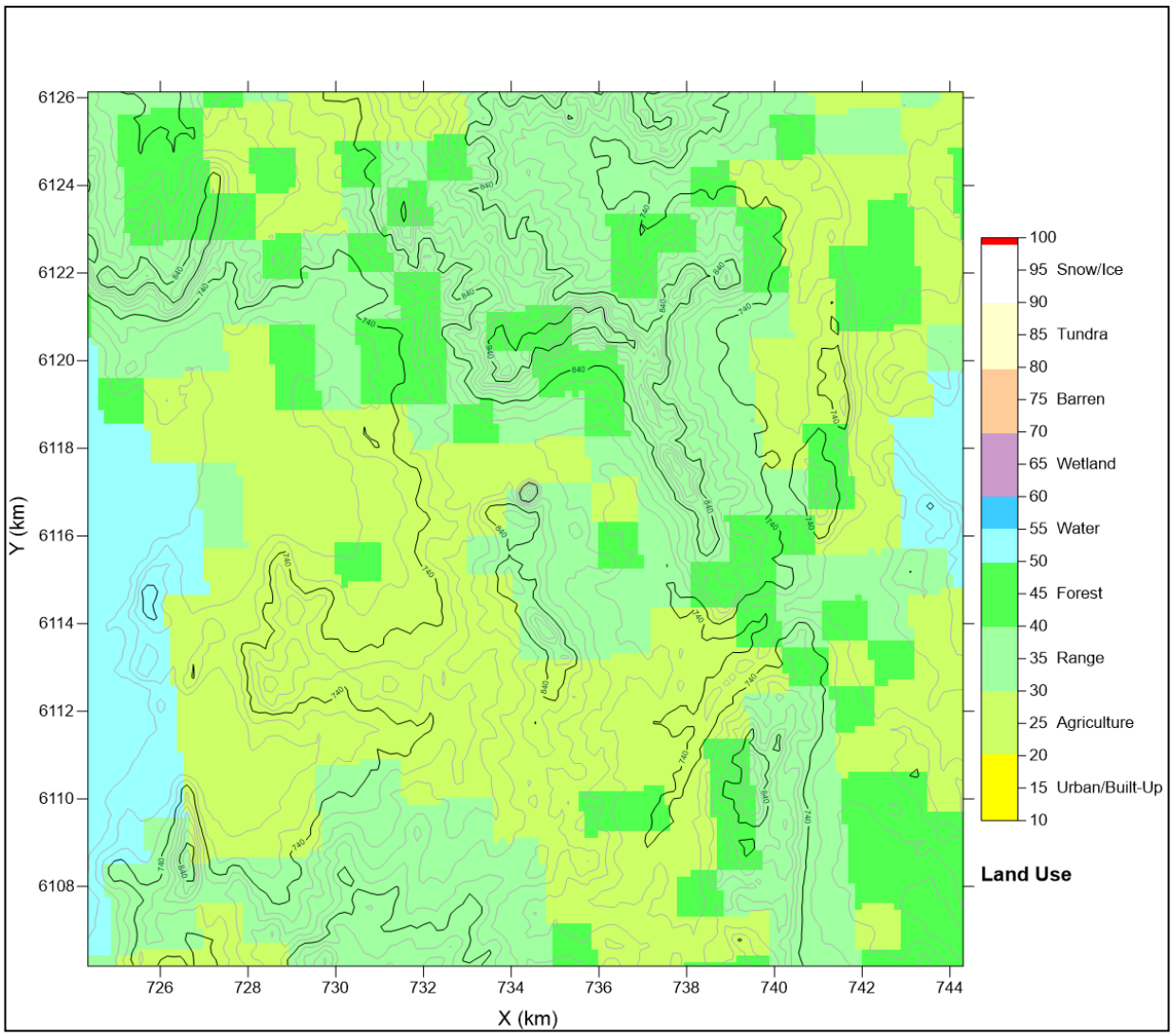


Figure 8.5 – Land use map of Woodlawn and surrounds

8.3.7 Meteorological configuration

8.3.7.1 Input data

One-hour average observed meteorological surface data for a representative year (2015) was sourced from Goulburn Airport that is maintained by the Bureau of Meteorology (**BOM**). The BOM data was formatted into a generic format and was processed with SMERGE to produce a surface meteorological data file.

Numerical meteorological data was produced as a 3D data tile from The Air Pollution Model (v4.0.5) and processed it with CALTAPM (v7.0.0) into a suitable format. TAPM was run using multiple nested grids, at least three nests and 35 vertical levels centred

over the Woodlawn site. TAPM innermost nest was 33 km by 33 km at 1 km resolution. The nested grid resolutions were close to a ratio of three as possible.

8.3.7.2 CALMET Meteorological Model Configuration

CALMET was run using the hybrid option that uses geophysical data, surface station data from Bundaberg Airport and upper-air data from the TAPM 3D data tile. The data was used to initialise the diagnostic functions of the CALMET module to produce a full 3D meteorology data for input into CALPUFF. **Table 8.5** shows the key variable fields selected.

8.3.7.3 Meteorological Data Analysis

Observed 2015 BOM surface data was compared with longer-term climate (2011 – 2015) from Goulburn Airport to gauge how representative and suitable the year is for air quality dispersion modelling. For reference, meteorological data were also extracted from the CALMET model for the location directly near the Woodlawn site office. The annual windroses for Goulburn Airport show very good agreement, with west-to-northwest winds dominating (**Figure 8.6**).

The Woodlawn windroses (**Figure 8.7**) show bias to lighter winds and greater frequency of east-to-south-easterly winds, perhaps due to influences from the nearby valley and ridgelines. A more conservative bias is expected relative to the observations at Goulburn Airport.

Both monthly average (**Figure 8.8**) and diurnal temperature (**Figure 8.9**) profiles for the long term and 2015 are in very good agreement. Diurnal mixing heights and stability class frequencies over the Woodlawn site are shown in **Figure 8.10** and **Figure 8.11**, respectively.

Table 8.5 – CALMET key variable fields												
Grid Configuration (WGS-84 UTM Zone 55S)												
134												**NX Cells**
134												**NY Cells**
0.15												**Cell Size (km)**
724.277					6106.107							**SW Corner (km)**
11												**Vertical Layers**
ZFACE (m)	0	20	40	80	160	320	640	1000	1500	2000	2500	3000
LAYER	1	2	3	4	5	6	7	8	9	10	11	
MID-PT (m)	10	30	60	120	240	480	820	1250	1750	2250	2750	

Critical Wind Field Settings			
Value	**Found**	**Typical**	**Values**
TERRAD	4	None	Terrain scale (km) for terrain effects
IEXTRP	-4	4,-4	Similarity extrap. of wind (-4 ignore upper stn sfc)
ICALM	0	0	Do Not extrapolate calm winds
RMAX1	6	None	MAX radius of influence over land in layer 1 (km)
RMAX2	8	None	MAX radius of influence over land aloft (km)
R1	3	None	Distance (km) where OBS wt = IGF wt in layer 1
R2	4	None	Distance (km) where OBS wt = IGF wt aloft

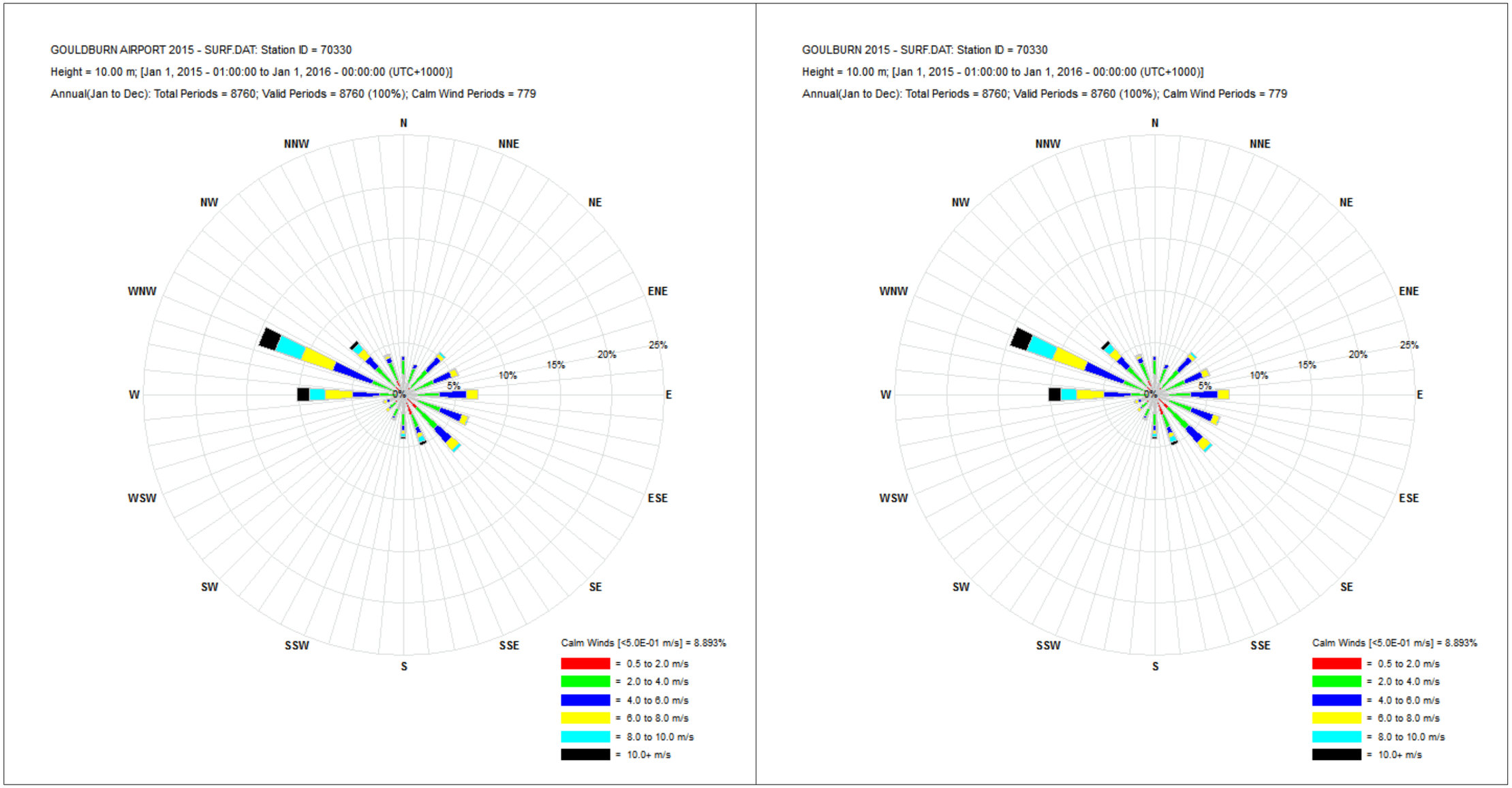
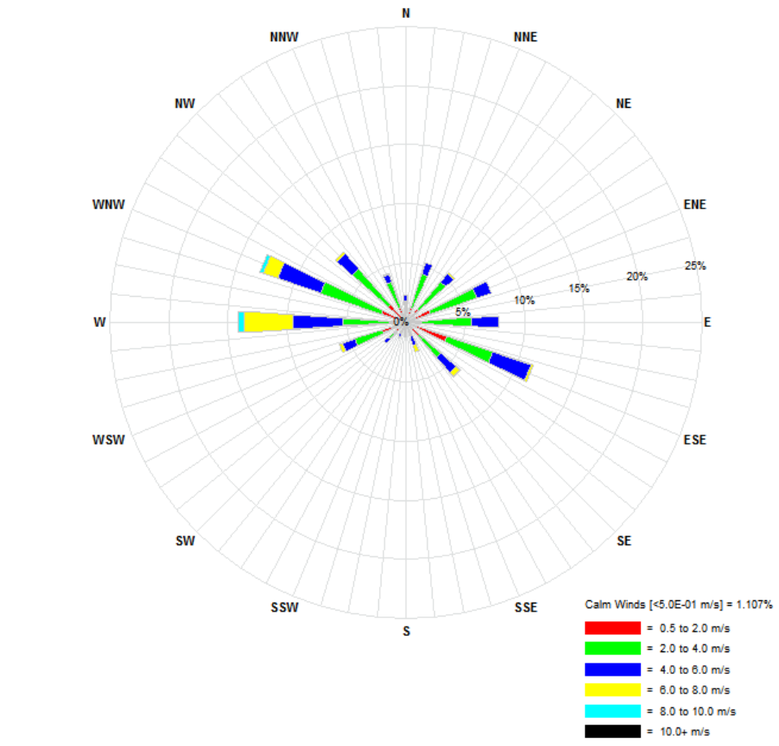
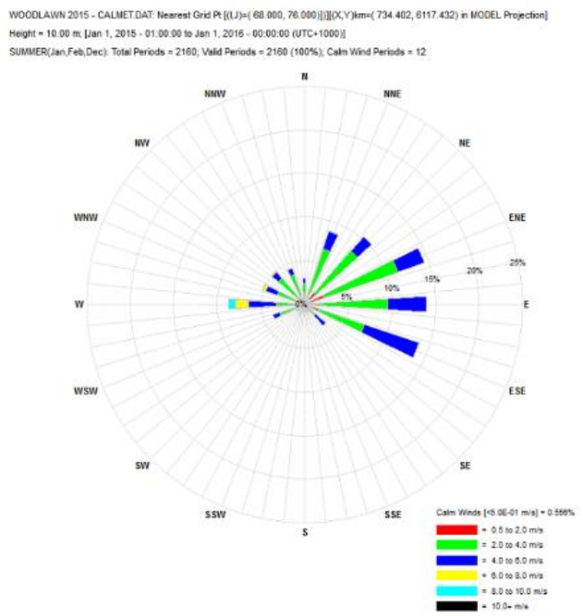
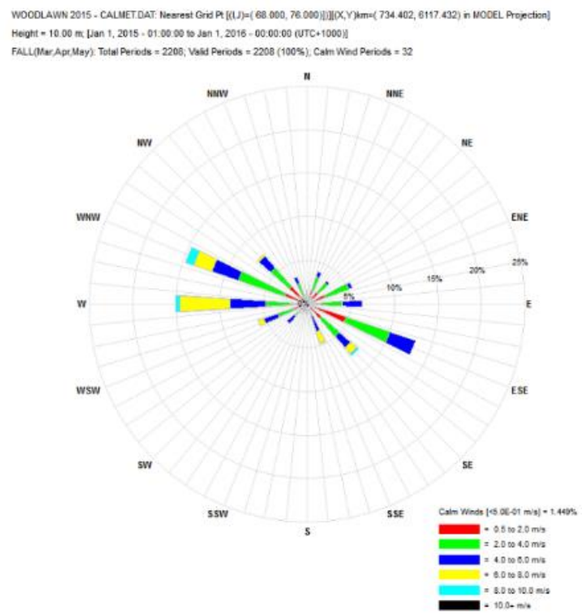
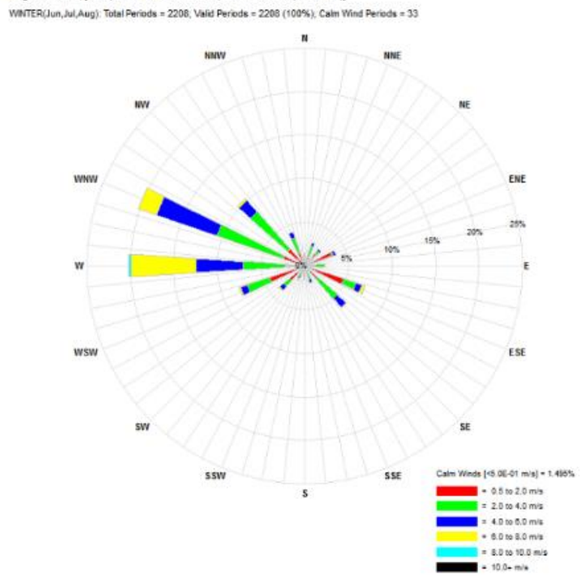


Figure 8.6 – Annual windroses for Goulburn Airport 5 years and 2015 only









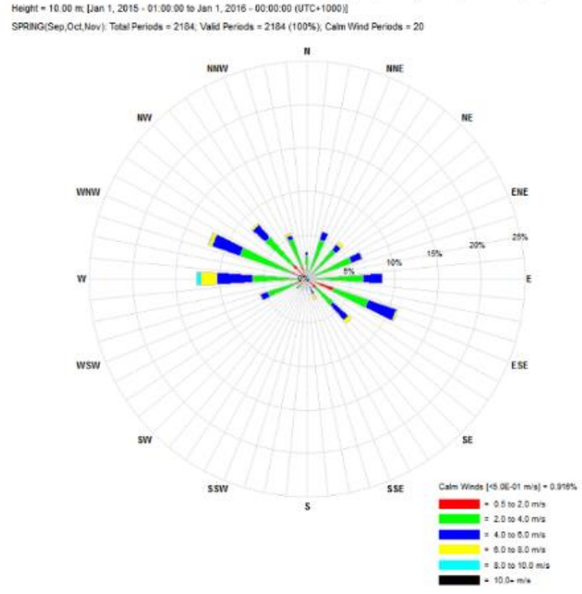


Figure 8.7 – Annual and seasonal windroses for Woodlawn 2015 (modelled)

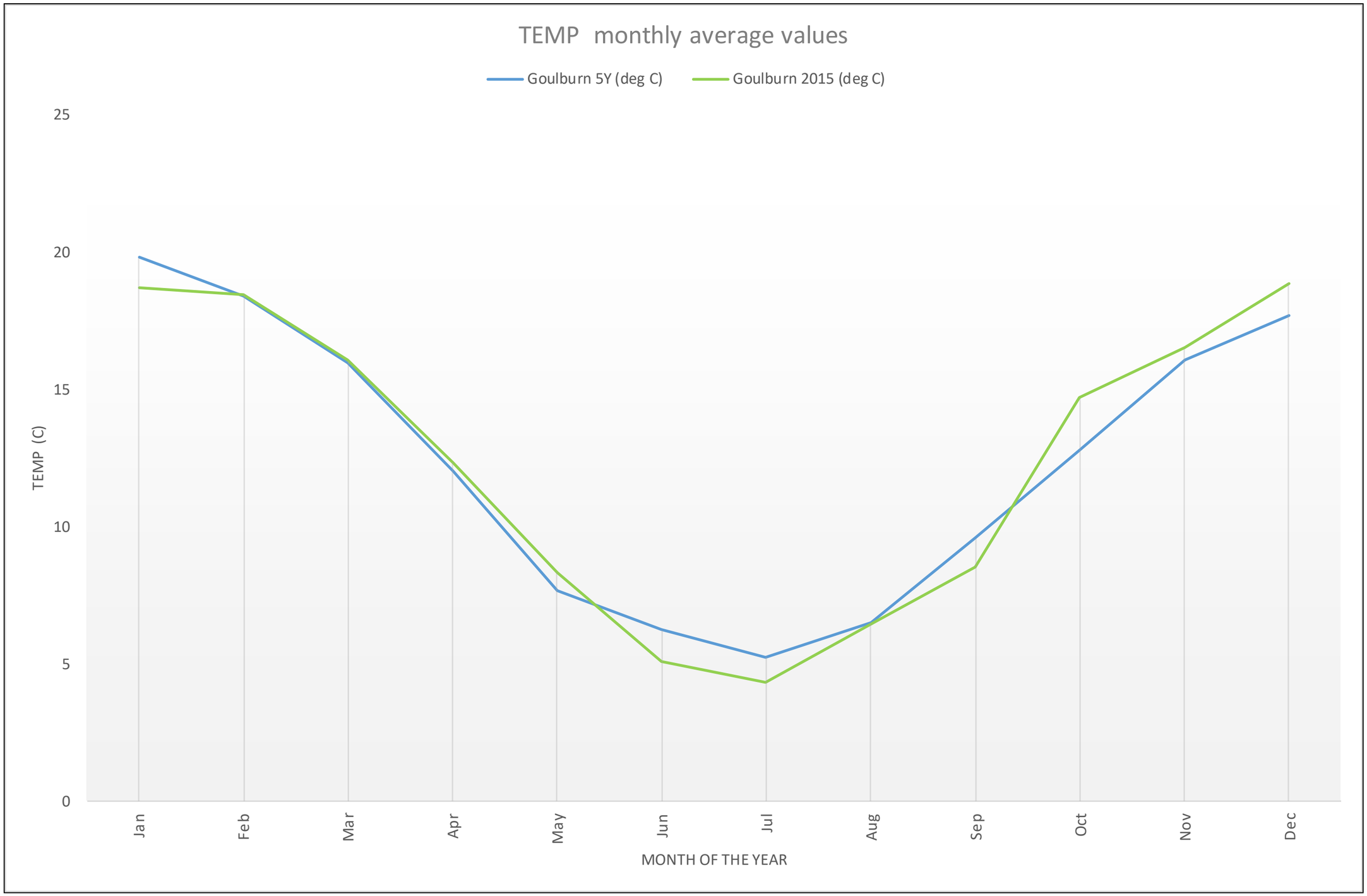


Figure 8.8 – Monthly average temperatures for Goulburn Airport 5 years and 2015 only

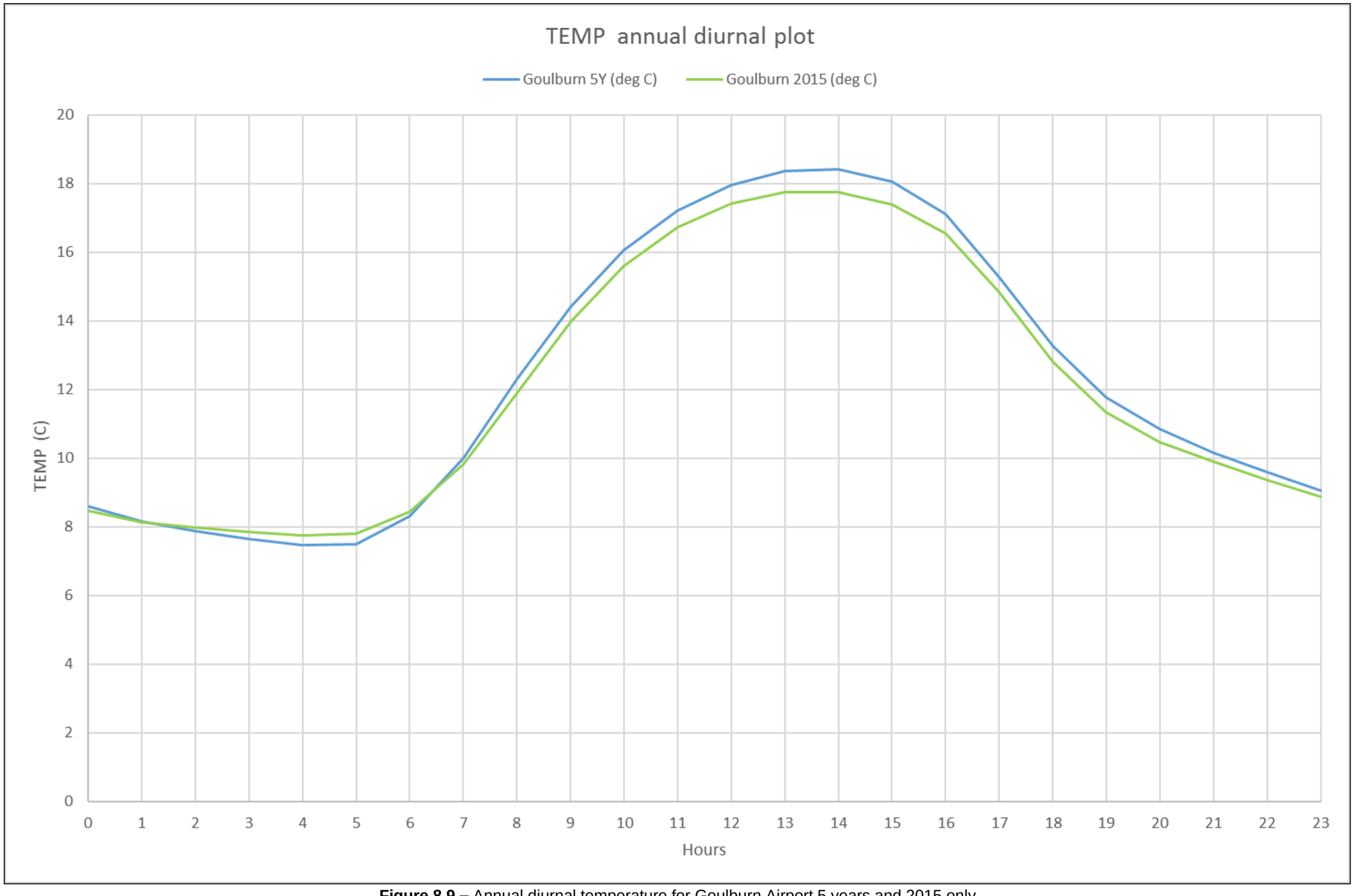


Figure 8.9 – Annual diurnal temperature for Goulburn Airport 5 years and 2015 only

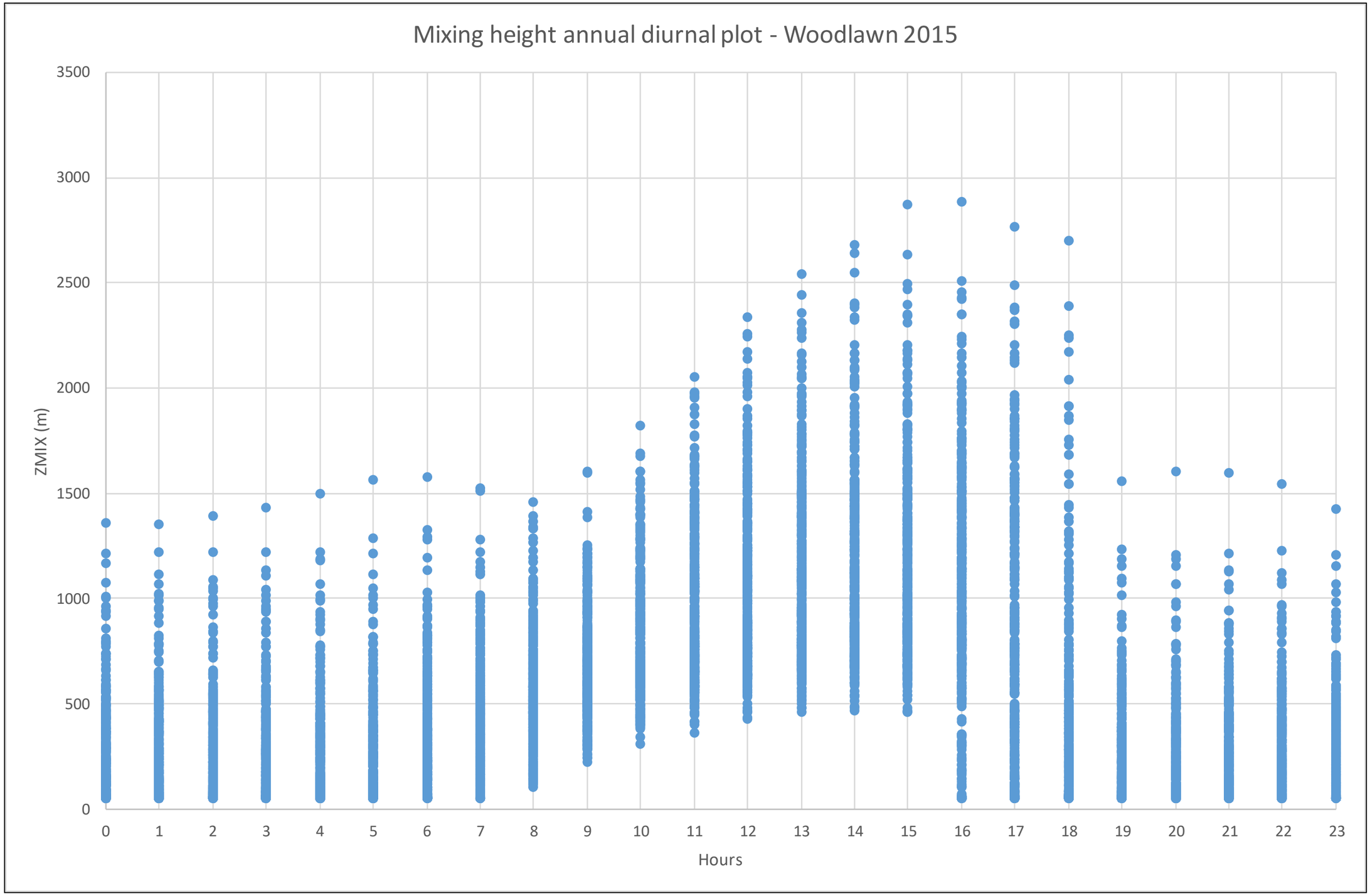


Figure 8.10 – Annual X-Y scatter plot diurnal mixing height for Woodlawn 2015 (modelled)

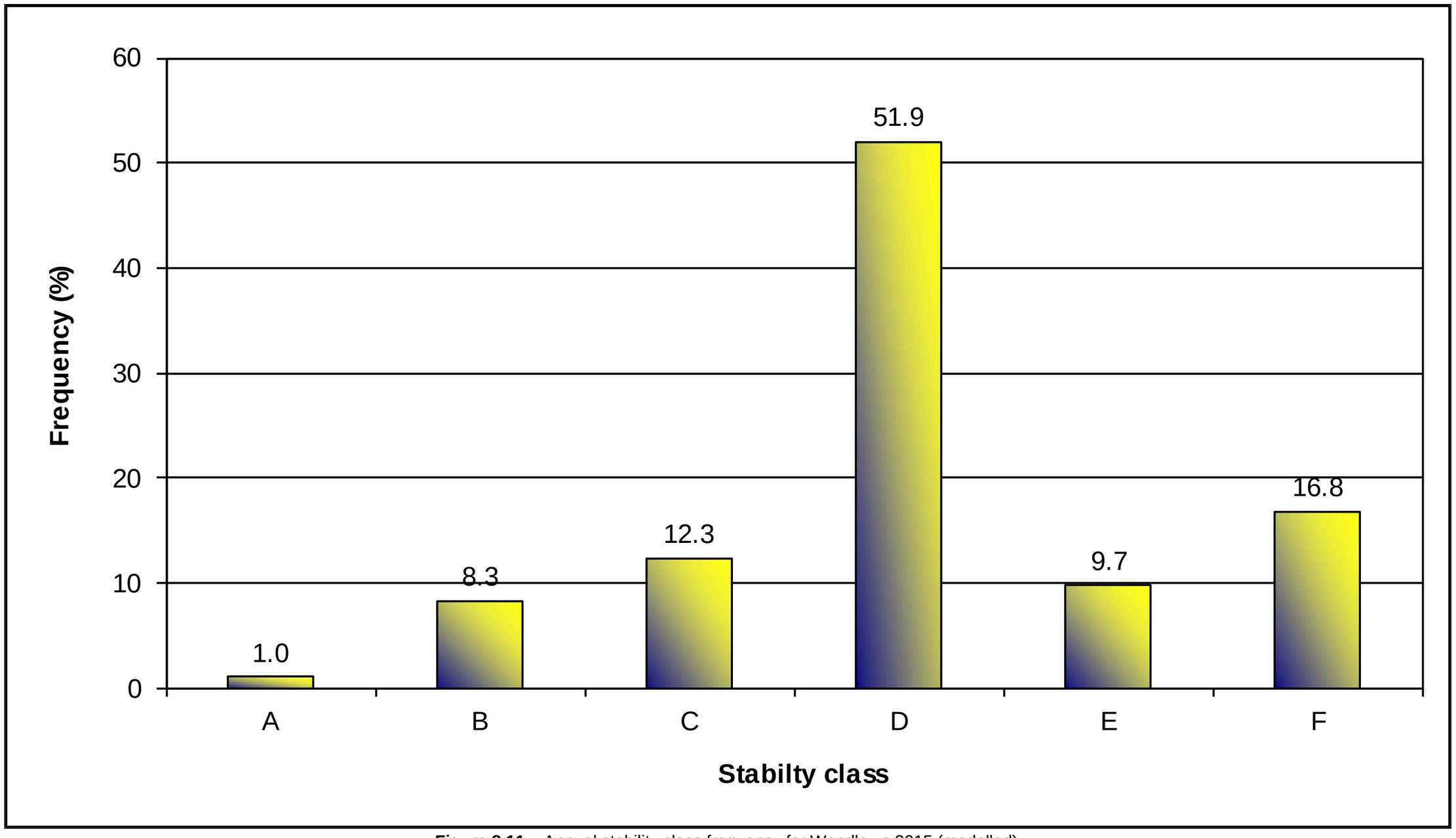


Figure 8.11 – Annual stability class frequency for Woodlawn 2015 (modelled)

8.3.8 CALPUFF Dispersion Model Configuration

8.3.8.1 Computational domain

The computational domain was set to the same parameters as the meteorological domain.

8.3.9 Receptor Configuration

Three groups of arbitrary discrete receptors were configured over the modelling domain. A receptor grid was created with a fine resolution inner nest of 9.6 km by 9.6 km by 0.15 km spacing; and an outer nest of 19.35 km by 19.35 km by 0.45 km spacing. A sensitive receptor was placed over the location of the main dwelling at the Torokina property to the southwest of the Woodlawn Facility operations. The discrete receptors over properties to the north and east of the Woodlawn Facility have been removed from the updated model as they are project-related residences and not considered relevant to the Audit.

8.3.10 Source Configuration and Emission Rates

Full odour source and emission rate configurations are available upon request.

8.3.11 CALPUFF Model Options

CALPUFF default model options were set except for the following as recommended in *Table A*-4 contained and explained within *Barclay and Scire (2011)*:

- Dispersion coefficients (MDISP) = dispersion coefficients from internally calculated sigma v, sigma w using micrometeorological variables (2);
- Probability Density Function used for dispersion under convective conditions (MPDF) = Yes (1); and
- Minimum turbulence velocities sigma v for each stability class over land and water (SVMIN) = 0.2 m/s for A, B, C, D, E, F (0.200, 0.200, … , 0.200).

8.4 ODOUR EMISSIONS SCENARIO

The odour emissions scenario used for the modelling was for what was observed during the Audit, except for the Waste Covered Area that used a dataset from the previous IOA and the Audit. This scenario represents TOU's best estimate of total odour emissions from normal operations. This scenario does not consider abnormal conditions or upset events (refer to **Section 7.2** for further commentary and context).

8.5 ODOUR DISPERSION MODELLING RESULTS

The odour dispersion modelling results are visually shown as contour plots that illustrate the contour plot of the ground level odour IAC of 6.0 ou (99%, P/M60) for the following source groups:

- **Figure 8.12** - Predicted odour impact from all odour sources of Woodlawn operations;
- **Figure 8.13** - Predicted odour impact from Bioreactor/Leachate and MBT source groups;

- **Figure 8.14** - Predicted odour impact from Leachate, LTP + ED1CD, and Void source groups; and

- **Figure 8.15** - Predicted odour impact from the MBT Pad + MBT LAP and MBT Biofilter source groups.

The predicted odour concentration at the Torokina property is provided in **Table 8.6** below, which indicates that the ground level odour concentration has not significantly changed since the previous model.

Table 8.6 – Sensitive receptor location and predicted odour impact result

Receptor	UTM East (km)	UTM North (km)	Elevation (m)	Ground level odour concentration (ou)
Torokina	731.336	6114.923	717	0.4

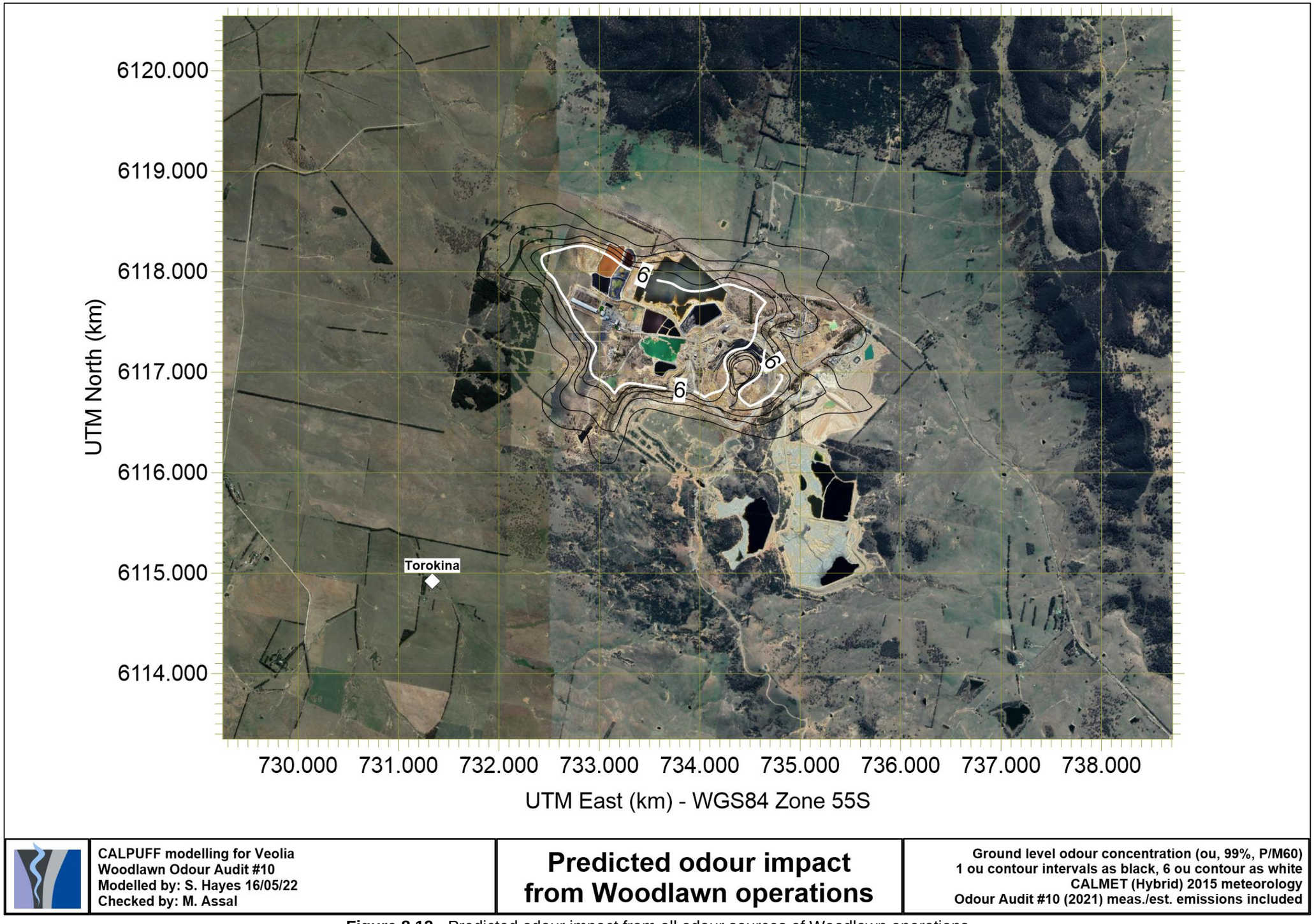


Figure 8.12 - Predicted odour impact from all odour sources of Woodlawn operations

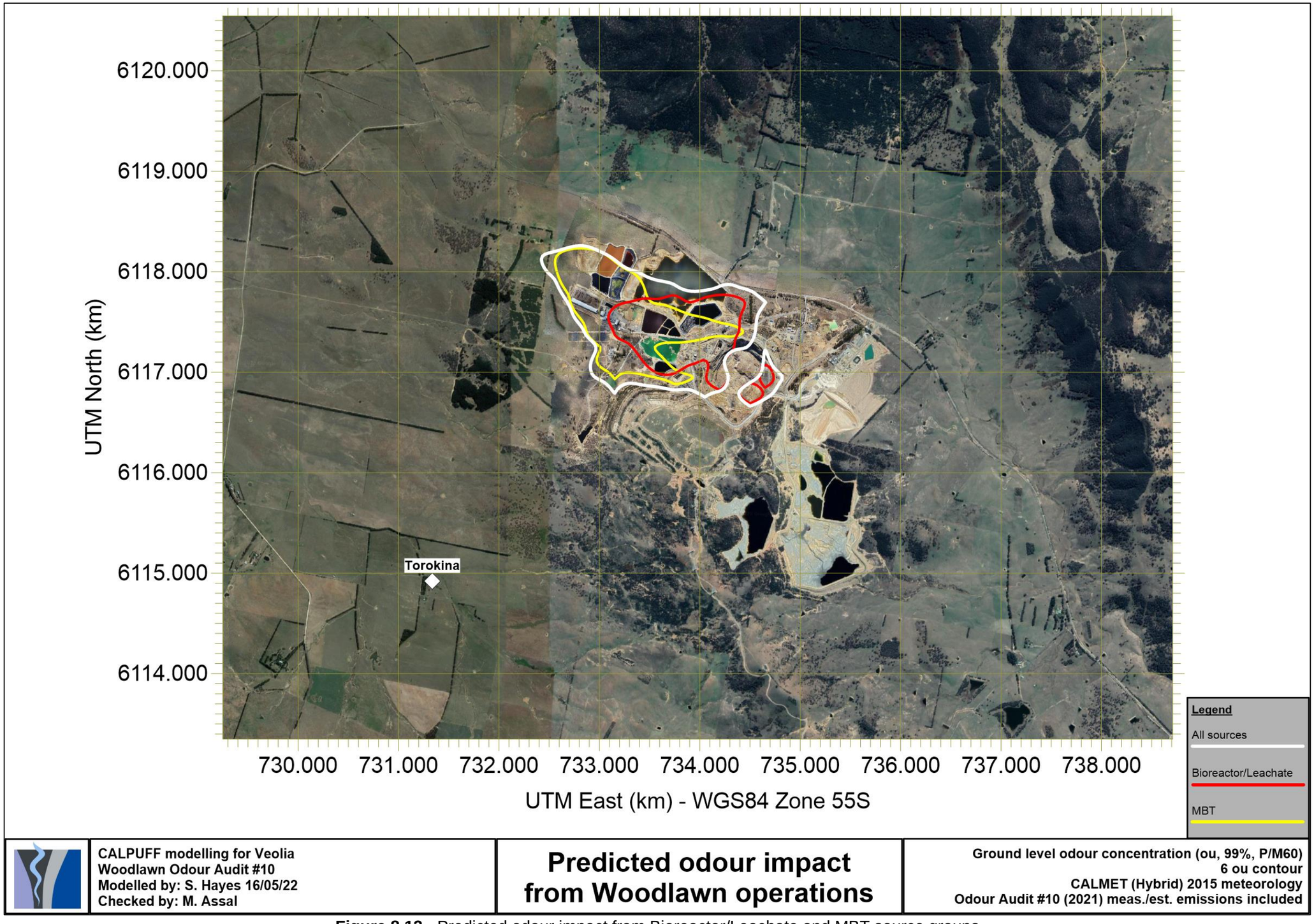


Figure 8.13 - Predicted odour impact from Bioreactor/Leachate and MBT source groups

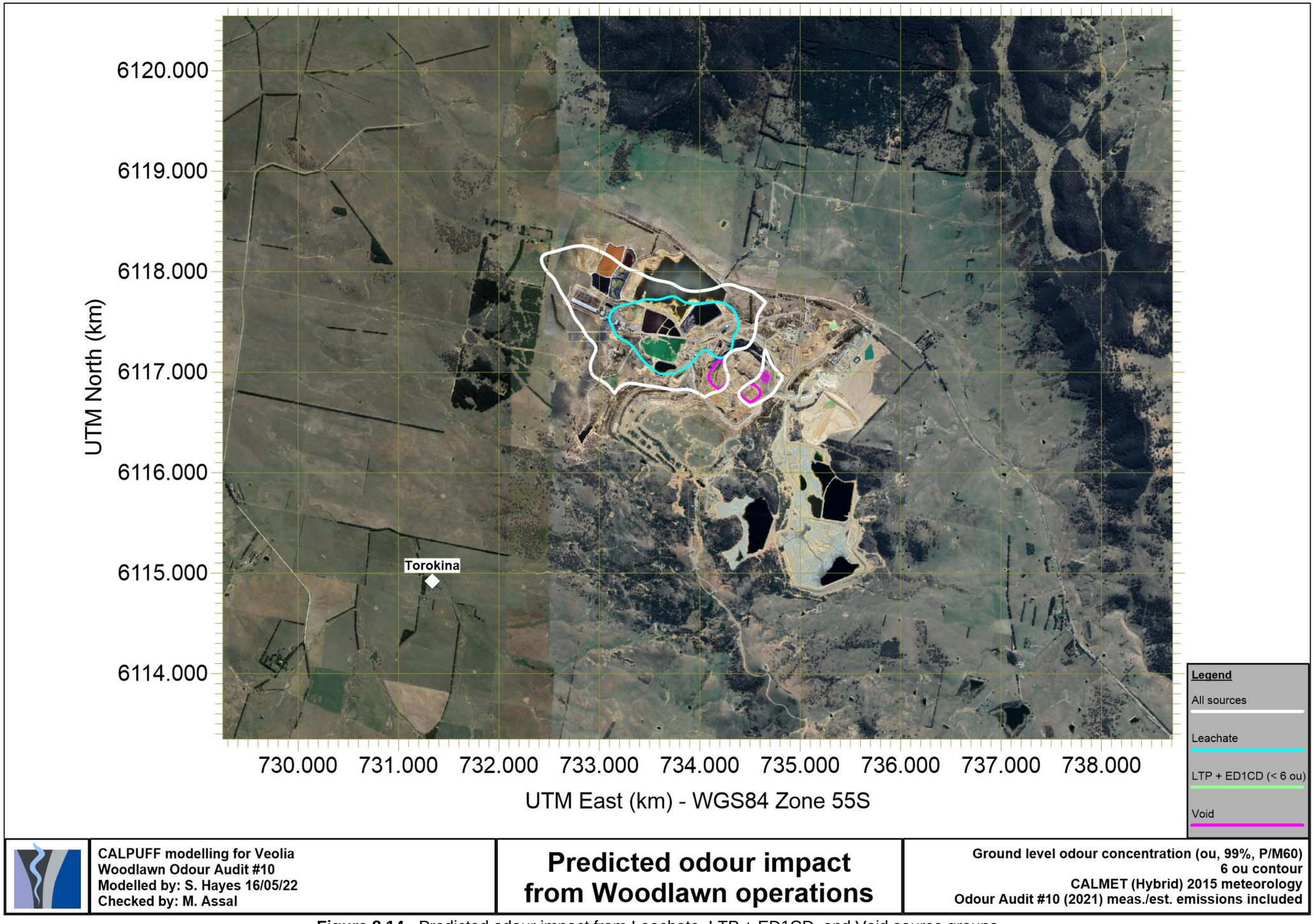


Figure 8.14 - Predicted odour impact from Leachate, LTP + ED1CD, and Void source groups

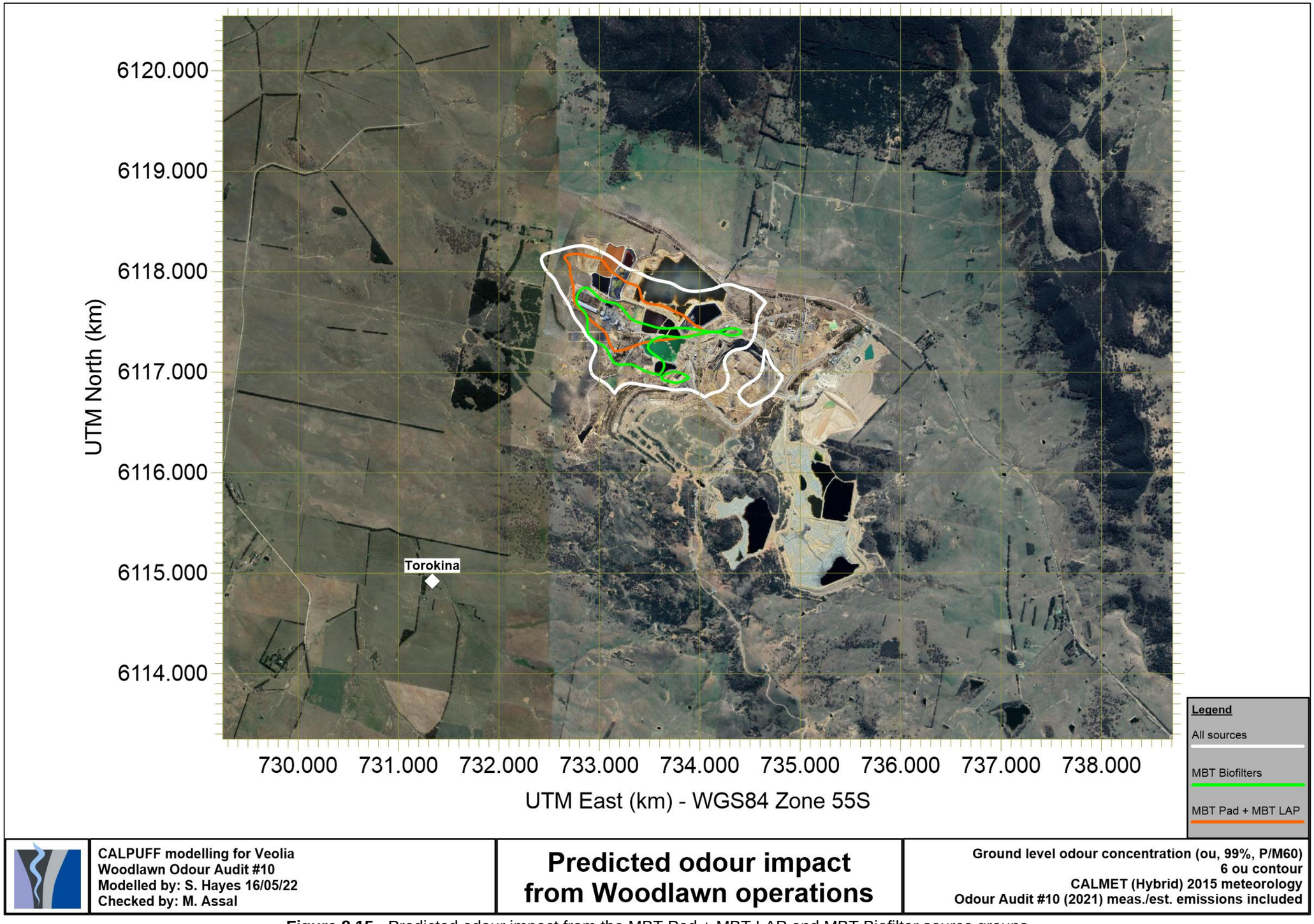


Figure 8.15 - Predicted odour impact from the MBT Pad + MBT LAP and MBT Biofilter source groups

8.6 MODELLING STUDY FINDINGS

An odour dispersion modelling analysis of the Woodlawn Facility in March 2022 was completed as part of the Audit. This involved the modification of the previous IOA model to best represent the present operations during the Audit period, i.e., calendar year 2021.

The odour emissions scenario used for the modelling was that observed during the Audit. This scenario represents TOU's best estimate of total odour emissions from normal operational conditions for the Woodlawn Bioreactor. This scenario does not consider abnormal conditions or upset events.

Overall, the predicted cumulative impact has reduced significantly since the previous IOA. It has also been found that the leachate and MBT sources contribute the most to the odour profile of the Woodlawn Facility, attributable to the measured OERs and source type characteristics (large pond surface areas). The modelling has found that the ground level concentration at the nearest sensitive receptor (i.e., the Torokina property dwelling) is predicted to be well below the NSW EPA odour IAC of 6.0 ou (99%, P/M60). This appears to be incongruent with the professional experience and expert understanding by TOU of the Woodlawn Facility operations, field observations during the Audit, and findings of the FAOA Survey – this exemplifies the inherent uncertainty in using dispersion modelling to assess odour impact, particularly for complex operations and the geographic location of the Woodlawn Facility.

The Audit considers that compliance with odour assessment criterion is one tool that provides an indication of acceptable odour impacts. The benchmark is if the emission of odour is offensive or is being prevented or minimised using best management practices and best available technology, with modelling used to comparatively evaluate different design or event scenarios. Therefore, the Audit considers that dispersion modelling may not be an appropriate tool to assess odour compliance or otherwise for the purpose of the defined objectives set in the Audit. This finding is support by previous IOAs and further discussed in **Section 8.6.1**.

8.6.1 Modelling Study Concluding Remarks

The modelling outcome outlined in the Audit is consistent with the previous IOA findings, where compliance was deemed likely given that the majority of the SOER and corresponding OER results were within the ranges used in the EA 2010 (refer to **Table 9.5**). However, it does not consider the unquantifiable impact as associated with fugitive gas emission pathways and operational impacts on the Void operations from high rainfall events over the Audit period (assessed via the undertaking of the FAOA survey monitoring program conducted in the Audit). Furthermore, the Audit finds that Veolia continues to actively undertake measures to minimise odour emissions from the Woodlawn Facility, including participation in a community consultation process designed to provide the necessary odour impact feedback. This feedback will continue to be important in the management of odour complaints/issues, particularly as a means of managing the increased number of complaints as observed in **Section 9.4.1**. The Audit recommends that this continues in the future as a means of determining compliance or otherwise with the project-specific goal.

9 AUDIT DISCUSSION

9.1 PREVIOUS AUDIT RECOMMENDATIONS

Section 9.1.1 and **Section 9.1.2** outline the mandatory and non-mandatory recommendations documented in the previous IOA, respectively, and Veolia's response to those recommendations since that time.

It is important to note that some of these recommendations are, and will continue to remain, an integral part of the on-going process operations and plans at the Woodlawn Facility. The WIP 2020 is a comprehensive and technically focused document aimed at educating management, operators and relevant stakeholders on the operational philosophy and continuous improvement and infrastructure development plans for the BWMS. These on-going process operations and plans are part of the WIP 2020 and include, but are not limited to:

- Planned infrastructure instalments within each waste lift;
- Landfill gas collection system including:
    - The design philosophy for the system of wells beneath the waste profile in the Void;
    - Well extensions; and
    - Horizontal infrastructure and condensate management.
- Continuous monitoring of leachate and gas extraction.
- Remediation actions in the event of equipment failure and process upset in the Void. It also documents the contingency measures implemented to ensure the sustained operation of the Void in the event of equipment failure and process upset.
- The implementation of operational management programs, including:
    - Leachate management;
    - Pumps and pumping solutions; and
    - The expansion of wells in the Void to optimise and improve landfill gas extraction and minimise leachate generation.
- Specific management techniques for:
- H_2S emission release to air;
- Covering of waste;

- The design, location, and implementation of the biofiltration cover material along the perimeter of the Void, where required;
- Intensification of the management of stormwater events as to minimise the generation of leachate and as principally endorsed by the Leachate Assessment;
- Management of leachate eruptions and power failures;
- Application of biocover material to manage fugitive gas emission pathways from the surface of the Void; and
- Details on current issues and long-term plan for the Woodlawn Facility.

The above on-going process operations (and others) are comprehensively documented in previous WIP 2020 and WIPS5 2022. The Audit notes that the WIP is a 'live' document that is constantly updated as the volume of waste into the Void increases over time.

Veolia made the full document of the WIP 2020 and WIPS5 2022 available for review in the Audit. As previously mentioned in **Section 1.3**, the relevant components of the WIP 2020 and WIPS5 2022 are incorporated into the Audit report, where required, as they are commercial-in-confidence documents.

9.1.1 Mandatory Recommendations

The mandatory recommendations from the previous 2020 IOA are summarised in **Table 9.1** and include the follow-up response to those recommendations as of the Audit. It is important to note that several the recommendations represent on-going continuous improvement, upgrade, modification, and optimisation works to the operations at the Woodlawn Facility.

9.1.2 Non-Mandatory Recommendations

The non-mandatory recommendations from the previous 2020 IOA are summarised in **Table 9.2** and include the follow-up response to those recommendations as of the Audit. Similar to that stated in **Section 9.1.1**, it is important to note that several the recommendations represent on-going continuous improvement, upgrade, modification, and optimisation works to the operations at the Woodlawn Facility

Table 9.1 - The 2020 IOA Mandatory Recommendations and Veolia's Response		
No.	**The 2020 IOA Mandatory Recommendations**	**Follow-up Response to Recommendation**
1	Fugitive landfill gas *emissions* *As mentioned in the Audit, the high rainfall conditions over the assessed period have impacted the efficacy of gas emissions containment and capture, with fugitive emissions pathways anecdotally more prevalent than the previous IOA. This is supported by the ingress of rainfall into the Void surface, reduction in landfill gas emissions since the previous IOA, the increase in complaints and results of the FAOA surveys in the Audit. As such, Veolia should continue to manage fugitive landfill gas pathways from the surface using the existing toolkit such as biocover material. Moreover, Veolia should enhance and accelerate its improvement to landfill gas capture from the Bioreactor as reasonably practicable. This continuation is apparent in the WIP 2020, which outlines a comprehensive plan that is being implemented to increase gas capture. The WIP 2020 also clearly seeks to address current areas of concern and the potential solution outcomes that can be implemented. This is an active (and effective) management approach that will result in a continual improvement in gas capture efficiency and ultimately reduce odour/landfill gas emissions from the Void. It will also assist Veolia in navigating through the high incidence of odour complaints and impacts from fugitive emissions from the Void surface. As such, the Audit endorses this strategy as the primary measure to reduce odour emissions from the Void and recommends that Veolia continues the implementation of the gas systems detailed in the WIP 2020, including:* ▪ *The augmentation of additional pipework and booster/flare/engine to the current capacity at the Site. In principle, the addition of the power station engines will increase landfill gas usage capacity, further facilitate the optimisation and minimisation of fugitive landfill gas release from the Void surface;* ▪ *the planned infrastructure instalments within each waste lift;* ▪ *the continuous improvement to leachate extraction, treatment performance, capacity, and efficiency. This is supported by the implementation of the long-term leachate solution in the form of the LTP that is the process-proving phase of operation;* ▪ *the continuous improvement in the waste tipping profile, covering and expansion and optimisation of the landfill gas infrastructure;* ▪ *the continuous monitoring of leachate and gas extraction;* ▪ *remediation actions in the event of equipment failure and process upset in the Void;* ▪ *continuous awareness of condensate [sic] management;* ▪ *The implementation of operational management programs, including:* ○ *Leachate management;* ○ *Pumps and pumping solutions; and* ○ *The expansion of wells in the Void for improved/minimisation of leachate recirculation and landfill gas extraction*. ▪ *application of biocover material to manage fugitive landfill gas emissions, as outlined in the WIP 2020.* *It should be noted that the WIP 2020 is a live document that will be continually updated. Therefore, it will continue to remain a part of the IOA.*	Veolia will continue to optimise landfill gas extraction and leachate management according to the strategies stated in the WIP 2020 and WIPS5 2022 to minimise the fugitive gas/odour emission. The on-going optimization of landfill gas extraction includes: ▪ Expansion of the landfill gas extraction system within the void as the landfill tipping progresses; ▪ Increase the landfill gas extraction and conveying capacity from the void to the on-site power station; ▪ Continue to extend landfill gas extraction wells with perforated pipe sections to enable extraction of landfill gas from different lifts; and ▪ Monitoring the landfill gas extraction system flow rate, suction pressure, and composition, to achieve quicker response to any system defect/failure. Veolia is committed to continuous improvement on odour management including: ▪ Installation of biocover material to identified areas of fugitive gas emissions to minimise odour; ▪ Develop the Odour Management Plan in line with licence conditions by the end of 2021; and ▪ Monthly surface gas monitoring for methane and H_2S. Veolia will continue to optimise landfill gas extraction and leachate management according to the strategies stated in the WIP 2020 to minimise the fugitive gas/odour emission.

Table 9.1 (continued) – The 2020 IOA Mandatory Recommendations and Veolia's Response

No.	The 2020 IOA Mandatory Recommendations	Follow-up Response to Recommendation
2	*<u>Leachate Management System</u>* *Veolia should continue to adequately maintain and manage the upgraded LMS to ensure it is operating in an optimum state and meeting the leachate quality monitoring targets as outlined in the Leachate Treatment Operation Manual and recommended by Veolia Water. Moreover, continue the implementations planned in the WIP 2020. Both the manual and WIP 2020 should be considered as a 'live' document to reflect any variation in quality and operational demands and identifications of new constraints and/or issues. This should continue to attenuate the potential for significant odour generation from the leachate stored in ED3N & ED3S Pond Systems both now and in the future. Furthermore, given the current treatment capacity in managing high rainfall events, if a suitable monitoring and performance metric protocol are established, the capability of diverting diluted contaminated stormwater to one of the evaporation dams (i.e. ED3S and ED3N) will present an opportunity to further mitigate the potential adverse impacts on the landfill gas capture infrastructure and ultimately provide an improved odour outcome under such circumstances.* *The Audit finds that the LTP has provided additional leachate treatment capacity at the Site. Moreover, the treated leachate flowing to ED1 coffer dam from the LTP is of a very high quality, as supported by the LOM results. The inclusive of additional leachate treatment capacity will have a significant effect on the minimisation of odour from the Void and LMS in the medium to long-term. In collaboration with Veolia, the next Audit will attempt to make provisions for safe access to enable sampling of the ED1 coffer dam, if practicable. Moreover, Veolia should closely monitor the following aspects of the LMS, including:* ▪ *COD and nitrate loading into the LTD and ED3S-S; and* ▪ *Effects of the continued volume reduction on ED3N-2, ED3N-3, and ED3N-4 from an odour perspective through regularly field odour spot checks downwind of each pond area.*	The continuous improvement on leachate management includes: ▪ Optimising leachate extraction and transfer infrastructure to provide more options and contingency for leachate management; ▪ Request contingency storage for contaminated stormwaters; ▪ Install an additional ultrafiltration process line at the LTP to optimise the throughput of the plant with expected completion by end of 2022; ▪ Review strategies and storage capacity for leachate; ▪ Continuous improvement of evaporation systems; and ▪ Continued regular monitoring of the water quality in the LTD, ED3S2, and ED3N from an odour perspective. Veolia continue to adequately maintain and manage the upgraded LMS to ensure it is operating in an optimum state and meeting the leachate quality monitoring targets as outlined in the Leachate Treatment Operation Manual and recommended by Veolia Water and continue the implementations planned in the WIP 2020.

Table 9.1 (continued) – The 2020 IOA Mandatory Recommendations and Veolia's Response		
No.	**The 2020 IOA Mandatory Recommendations**	**Follow-up Response to Recommendation**
3	*Active Tipping Face* *Veolia should continue to develop strategies for the minimising of the exposed active tipping face surface area. It should also proceed and continue with the details in the WIP 2020.*	Global positioning system assisted tipping activity will be continuously conducted according to WIP 2020. Veolia notes that changes to the tipping profile to maximise stormwater capture and removal has increased the active tipping face. It is expected leachate minimisation will have a larger material impact on odour compared to the minimisation of the active tipping area. This recommendation will be proactively pursed as soon as the desired Void surface profile changes have been achieved. Veolia notes that it is progressively moving to a tent shape from the current pyramid design (consistent with the outcome of the Leachate Assessment). Following the completion of the tent profile, consideration will be given to an east to west slope to allow stormwater removal.
4	*Refine Investigation of Odour Issues in the Community* *Given the significant increase in odour complaints documented in the Audit, the Audit recommends that Veolia enhance its community engagement and liaison process. It is understood this has already commenced via the reinstatement of the odour diary program in February 2021. As such, the refinement and enhancement of community engagement is a mandatory recommendation in the Audit. Furthermore, Veolia should consider refining its investigation of odour issues in the community, particularly surrounding the most common complainants, to assess the extent to which odour is present in the community. Such an investigation could include:* ▪ *potential odour transport pathways;* ▪ *the undertaking of field odour surveys;* ▪ *assess the topography of surrounding land and analysis of climatic data; and* ▪ *a detailed review of odour complaint data.*	The continuous improvement on odour complaint management includes: ▪ Continue to engage with complainants to better understand potential odour sources through invitations to site and odour identification; ▪ Veolia will continue to periodically visit complainants directly to discuss the events and type of odour. Invitation to the complainants for a Woodlawn site visit is included in this consultation; ▪ Continued community engagement through various groups (i.e., Tarago and district Progress Association Inc (**TADPAI**), Tarago Times publications & Community Liaison Committee, Open days); ▪ Refine the Odour Management Plan to incorporate defined criteria following an odour complaint; and ▪ Veolia will continue to manage the odour complaints in-line with the complaint's procedures. There is active work on the refinement of the odour complaints handling process.

Table 9.2 - The 2020 IOA Non-mandatory recommendations and Veolia's Response		
No.	**The 2020 IOA Non-Mandatory Recommendations**	**Follow-up Response to Recommendation**
1	*IMF and Waste Transport Activities* *Based on TOU observations, the Audit suggests that Veolia continue to review the following aspects relating to the use of the IMF and waste transport activities to further improve its odour performance as a minor and transient source of odour, namely:* ▪ *The washing practice associated with the sealed containers; and* ▪ *The maintenance of the sealed containers.*	Veolia will continue to monitor the operation of the container and truck wheel washing practices on site. Veolia will continue to monitor and maintain the integrity of the containers on a regular schedule, utilising an automated system to schedule regular maintenance and checks of containers in the fleet. Veolia notes that the Clyde and Banksmeadow Transfer Stations are working with the maintenance team with respect to container management and maintenance. The wheel wash is on the monthly inspection checklist and is recorded in Rivo.
2	*Odour Mitigation from the MBT Facility* *The Audit recommends a heightened awareness of the operability and maintenance of the biofilter-based odour control system at the MBT Facility, which should be consistent with the Biofilter Manual to ensure optimal and sustained odour removal performance. Given that the MBT Facility operation is a recent addition to the Audit, a benchmark process will be developed and reviewed as part of subsequent IOAs to assess the operability and odour performance of the biofilter-based odour control system with the objective of continuous improvement in odour mitigation and optimisation. It is recommended that the MBT Facility improve its overall management of biofilter bed moisture to ensure optimum odour removal performance. This can be achieved by an intensification of the surface drip irrigation system and/or optimisation of the current spray humidification system. Furthermore, it is understood that the MBT Facility has assigned dedicated personnel to manage and maintain the biofilter system – this will facilitate in the effective execution of continuous improvement and optimisation works.*	Veolia will continue to inspect the MBT Biofilter System on a regular basis in accordance with the Biofilter Manual to maintain suitable moisture, airflow rate and pressure of the process and ventilation air from the buildings to optimise and maintain good air quality and effective odour control. Veolia will develop and implement an improved automated asset maintenance system to improve management of the biofilter bed moisture levels and create a benchmark process in consultation with TOU prior to the next IOA. Furthermore, Veolia has developed and implemented an automated preventative maintenance schedule through the Veolia Asset Management System, referred to as VAMS. Further to this, Veolia conducts weekly checks to maintain optimum conditions of the biofilters. Veolia will engage TOU to assess biofilter operation prior to next IOA.

9.2 DISCUSSION OF AUDIT OUTCOMES

The following discussion examines the outcomes of the Audit against each of the conditions of consent as outlined in **Section 1.3**.

9.2.1 Condition 7 (B & D)

Condition 7 (B & D) of the Audit requirements stipulate that the following will be carried out in the IOA:

- *Audit the effectiveness of the odour controls on-site in regard to protecting receivers against offensive odour; and*
- *Review the relevant odour sections of the Air Quality and Greenhouse Gas Management Plan for the project and assess the effectiveness of odour control.*

As mentioned in the previous IOAs and complemented by the Audit's on-site experience and discussions with Veolia personnel, there continues to be a range of current and on-going odour controls implemented at the Woodlawn Facility designed to mitigate off-site impacts arising from its waste management operations. These revolve around:

1. The leachate recirculation method (refer to **Section 9.2.1.1**);
2. Optimisation and continuous treatment of excess leachate from the Void (refer to **Section 9.2.1.1**);
3. Improvement of landfill gas extraction from the Bioreactor (refer to **Section 9.2.1.2**);
4. Adequate combustion of landfill gas (refer to **Section 9.2.1.2.1.1**);
5. Improve evaporation capability (refer to **Section 9.2.1.6**);
6. The continued implementation of biofilter cover material, particularly in known high-risk areas such as the Void perimeter where shrinkage effects are pronounced and cracks in surface cover (refer to **Section 9.2.1.7**);
7. Using the minimal active tipping face as practically possible (refer to **Section 9.2.1.8**);
8. Water cart to control dust (refer to **Section 9.2.1.9**);
9. Transportation of waste in sealed containers until unloading at the Bioreactor (refer to **Section 9.2.1.10**);
10. The minimisation of leachate generation during stormwater events through improved surface catchment management (refer to **Section 9.2.1.12**);
11. The effectiveness of the current odour control infrastructure at the MBT Facility (refer to **Section 9.2.1.13**); and

12. Quality of compost product stored in the Maturation Storage Pad Area (refer to Section **9.2.1.14**).

9.2.1.1 Leachate Management Method

9.2.1.1.1 Operational Status of Leachate Recirculation

To increase the landfill gas capture through the covered waste surfaces, leachate generated within the Bioreactor is removed when it exceeds the field capacity or interferes with gas extraction infrastructure. Any excess leachate that is extracted from the Void flows directly to the LTD or LTP for primary leachate treatment (refer to **Section 2.4** for further details).

The leachate recirculation method currently practised within the Void continues to be via direct injection techniques when required (refer to **Section 2.3.2**). As explained in previous IOAs, this has the effect of minimising the potential exposure of leachate partitioning from the liquid phase to the gas phase, through aerosol generation and/or evaporation pathways, and subsequently leading to the generation of odorous emissions. The 2012 IOA indicated that Veolia's adoption of this recirculation technique is more effective at minimising odours than previously utilised techniques (such as spray sprinklers). The previous 2013 IOA concurred with this finding and remains valid.

As previously mentioned in **Section 2.3.2** and based on the WIP 2020, the use of leachate recirculation is no longer needed for maintaining effective steady-state operations within the waste mass of the Bioreactor. It is only used or required during exceptional circumstances. As such, there is only one reinjection infrastructure being kept as a contingency leachate management method when the leachate transfer system experiences any failure or requires maintenance. The reinjection point is currently located in the eastern wall of the void, with a 110 mm high-density polyethylene pipe placed into the waste prior to the RL730 lift (refer to **Figure 6.2** for details). The reinjection point is connected to the ring main and is normally in the closed position. In the circumstance of leachate transfer system failure or any downtime due to maintenance schedule, e.g., pump failure or pipe damage, the valve between the reinjection point and the ring main will be opened to allow the extracted leachate to be re-injected to the waste. The reinjection will be stopped once the leachate transfer system is back to normal operation.

9.2.1.1.2 Leachate Reinjection Contingency

As part of operational contingency, it is noted in the WIPS5 2022 that another reinjection point will be setup at well J07 (refer to **Figure 6.2**) to supplement the main reinjection point. This will use the whole subsurface rock trench as the leachate storage reservoir. This reinjection trench will only be used when the leachate transfer system fails and will serve to keep the bund area dry and avoid equipment damage. During this operational scenario, repair actions will be conducted as soon as possible. This supplementary reinjection point is intended to only be used for no more than a day to enable repair/remedial works to be completed.

9.2.1.1.3 Optimisation and continuous treatment of excess leachate from the Void

The LTD

The Audit understands that there is no longer a need to store untreated leachate in the evaporation dams following the upgrade improvements made to the LTD system since April 2013 (refer to previous 2013 IOA for details) and the growing waste volumes in the Bioreactor. Moreover, since the 2014 IOA, Veolia has further modified the leachate treatment process by dividing the LTD into two treatment zones, namely (in order of process flow):

- an anoxic zone; and
- an aerobic zone.

The splitting into these zones appears to suggest that the Woodlawn Facility has converted the LTD into an activated sludge treatment process, which is aimed at optimising chemical oxygen demand (**COD**) reduction and/or nitrification/denitrification processes. This modification reflects Veolia's on-going efforts in optimising the treatment process. From an odour emissions viewpoint, the optimisation of leachate treatment has significantly improved and maintained the Woodlawn Facility's odour emissions profile from a pond-related source (refer to **Section 9.5.1**).

Based on the details above, the Audit continues to support this modification from a leachate treatment perspective, provided that optimum conditions in the LTD are sustained and continue to result in good quality treated leachate that contains none of the original odour characteristics of untreated leachate. It is understood that Veolia continues to regularly monitor the treated leachate quality and performance.

The LTP

The Woodlawn Facility has constructed and commissioned an MBR-based facility (i.e., the LTP) as the long-term leachate management strategy. As indicated in the WIP 2020, the LTP is in the process proving stage which includes, but is not limited to, biomass growth, biological process tuning, and process optimisation. The LTP is based on a modified activated sludge biological process to treat the main parameters found in the raw leachate extracted from Bioreactor to a higher quality effluent. The LTD and LTP are currently operated simultaneously at the Woodlawn Facility, providing an improved capability in leachate management and treatment capacities from the Void.

Based on the above analysis, no further action is required by Veolia on this matter. If, however, there are future operational issues with the LMS, Veolia should take the precautionary measures of notifying the NSW EPA (and any other relevant stakeholders) until the issue is rectified.

9.2.1.1.4 Wet Weather Management

The LTD and LTP are currently operated simultaneously at the Woodlawn Facility, providing an improvement in leachate management and treatment capacities from the Void, particularly in managing wet weather conditions. As noted in the Leachate

Assessment, Veolia has increased leachate extractions since May 2021 to reduce leachate volumes in the Void and to increase the depth of the unsaturated zone. This is achieved via the deployment of additional mobile pumps and sumps/dams/drainage in the Bioreactor to address the wet weather period.

Based on the Leachate Assessment, it is understood that annual leachate extraction rates from September 2018 to May 2021 were below 4 L/sec. The Leachate extraction rates from September 2018 range from approximately 2.4 to 3.5 L/sec (monthly average), with an overall average of approximately 2.66 L/sec (over the 33 months). A previous water balance completed in 2016 by Earth2Water recommended a leachate extraction rate of approximately 3 L/s. As also noted in the Leachate Assessment, the need to reduce leachate generation by extracting stormwater is considered more effective than increasing leachate extraction rates through the treatment system, especially during storm events. A leachate management strategy comprising high flow extraction of stormwater/slightly impacted stormwater, flexible leachate extraction rates, and maximizing extractions during summer months for evaporation dams is beneficial for managing leachate levels in the bioreactor. This recommended approach is consistent with previous IOAs (refer to *Section 10.2.2* of the previous 2020 IOA) and on-going operational objective of reducing odour emissions from the Void surface triggered by ingress of stormwater (particularly during high rainfall events).

Overall, the Audit supports Veolia and the view expressed in the Leachate Assessment that the integration of landfill operations with efficient stormwater management is considered a key aspect of managing leachate generation. A process of on-going diversion of runoff derived from benches and improved diversion/collection of run-off over the waste surface would enable less demand on the leachate extraction works, particularly during high rainfall periods.

9.2.1.2 Improvement of Landfill Gas Extraction from the Bioreactor

Landfill gas extraction at the Woodlawn Facility is an on-going operational process. The WIP 2020 indicates that there is a comprehensive plan by Veolia to increase gas capture by undertaking the following key items:

1. The continuous expansion of the new capture system to promote gas collection;

2. Management of leachate via minimising surface water flow, leachate recirculation, improvement in landfill gas infrastructure design and condensate management, and improvement in continuous treatment capacity and efficiency (achieved via the installation of the LTP); and

3. Installation of an additional flare system (Flare 3 commissioned in June 2021) to manage excess landfill gas extraction. There are a total of three landfill gas flare systems operating at the Woodlawn Facility.

Further information regarding the design and operation of the landfill gas extraction system has been previously documented in extensive detail in the 2012 IOA Report. As such, it has not been documented in the Audit.

9.2.1.2.1 Landfill Gas Extraction and Fugitive Emissions

As outlined in the previous IOAs, it remains difficult to calculate a representative odour emission rate from the Void, given the dynamic virtue of the surface layout. Therefore, as per the previous IOA, an alternative approach has been taken where improvement in landfill gas capture efficiency is used as an indicator of reduced potential for fugitive gas emissions from the Void surface in combination with leachate extraction and stormwater ingress to the Void.

As required, the Audit has obtained landfill gas production data, which includes landfill gas flowing to the cogeneration engines and the flare systems. **Table 9.3** summarises the average monthly landfill gas extraction results over the period between March 2021 and March 2022 and compares this result to that obtained in the 2020 IOA. As can be derived from the results in **Table 9.3**, the monthly averaged landfill gas extraction over the period between March 2021 and March 2022 was approximately 3,056,765 m^3 (gas to generators plus flared). In comparison to the gas extraction result obtained from the previous period in the 2020 IOA (i.e., 2,689,206 m^3), this represents a 12% increase in total gas extraction volume (equivalent to 367,559 m^3). However, these results appear to be biased as June 2021 had an exceptionally high landfill gas extraction to Flare 3, likely representing the commissioning of this additional infrastructure. As such, the more representative change in landfill gas extraction performance is a 2% increase since the 2020 IOA if we exclude the July 2021 data from Flare 3 – this is a positive result given the high rainfall events and its potential challenges to landfill gas capture capability.

Table 9.3 – Monthly landfill gas extraction between 2020 IOA & the Audit

Summary table	Values
2020 IOA landfill gas extraction (m^3/month)	2,689,206
The Audit landfill gas extraction (m^3/month)	3,056,765
Improvement performance	+12%
Corrected improvement performance (excludes July 2021)	+2%

The landfill gas trend between March 2021 and March 2022 is illustrated in **Figure 9.1**.
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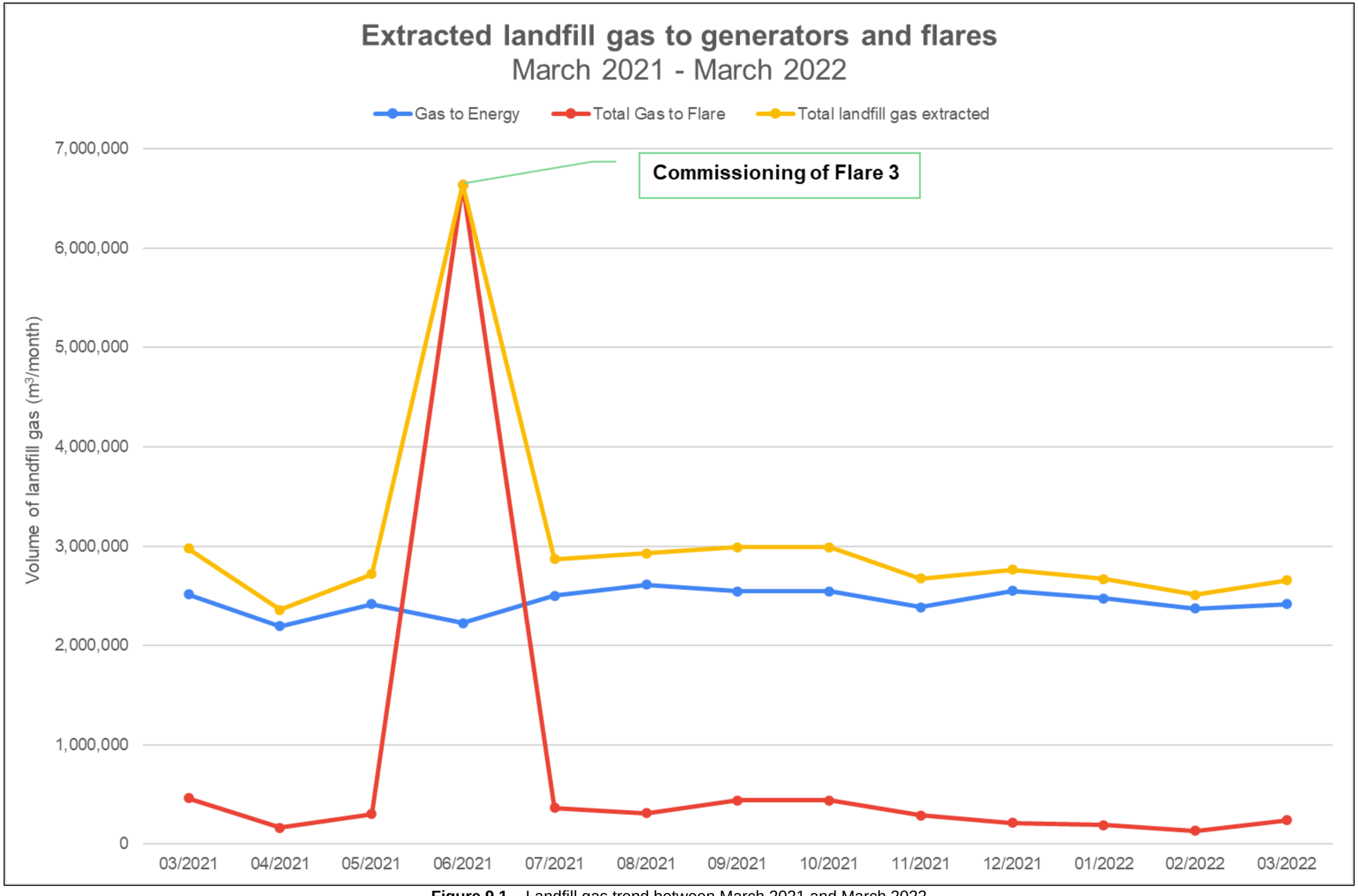

Figure 9.1 – Landfill gas trend between March 2021 and March 2022

9.2.1.2.1.1 Fugitive Landfill Gas Emissions

As noted in the previous 2020 IOA, the Audit understands that gas capture is measured against a calculated emissions model issued by the *Australian Government – Clean Energy Regulator*. This aspect is outside the scope of the Audit and is therefore not discussed further. Nevertheless, as demonstrated in previous IOAs, it remains clear that fugitive landfill gas emissions emitted from the Void surface can have a very high odour emission potential if gas capture efficiency declines. Therefore, the Audit continues to endorse Veolia's plan to actively improve gas extraction capability from the Bioreactor and the items addressed in the WIP 2020 to achieve this, including:

- Gas field balancing, where individual gas extraction wells in the gas extraction network are monitored routinely for gas composition and pressure. This monitoring aims to achieve the following operational objectives:
- Adjust wells to optimise landfill gas extraction;
- Determine if any wells are damaged or malfunctioning;
- Determine average and highest H_2S exposure;
- Occupational, health and safety concerns regarding H_2S exposure; and
- Odour management.
- Condensate management;
- Monitoring of leachate extraction and treatment, as this improves gas extraction capacities;
- Biofilter cover material on high-risk areas prone to fugitive emissions, particularly in around the Void perimeter (refer to **Section 9.2.1.7** for further details) and cracks in the surface cover of the Void;
- Optimise tipping strategy, as this ultimately affects the efficiency of landfill gas and leachate;
- The connection of more wells/trenches;
- The implementation of the long-term leachate strategy via the commissioning of the LTP; and
- Consider the undertaking of a trial for an alternative daily cover to identify potential operational benefits compared with current practices. This trial was completed in December 2020 and is understood to be still awaiting review and approval by NSW EPA at the time of the Audit. The trial indicated that the alternative daily cover via the application of mixed waste organic material (**MWOO**) was effective and had the potential to improve the odour performance

outcome from the surface operations of the Void and to manage fugitive odour emission release in conjunction with the existing biocover material. The trial outcomes are documented in a report titled *Veolia Environmental Services (Australia) Pty Ltd - Alternative Daily Cover – Odour Trial Study: December 2020 – Final Report*, 16 December 2020 (the **December 2020 ADC Report**).

9.2.1.2.1.2 Monthly Surface Gas Monitoring

Since April 2021, The Audit obtained monthly surface gas monitoring data of the Void surface as completed by Veolia. Based on a review of the gas monitoring method, it is understood that the monthly surface gas monitoring protocol is as follows:

- The target gas compounds using the selected gas monitoring instruments include CH_4 and H_2S. These two gas analytes are considered reliable indicators of fugitive gas emission release from the surface of the Woodlawn Bioreactor;

- The monitoring protocol is consistent with the guidance provided in Section 5.2 - Landfill gas surface emissions monitoring of the *New South Wales Environment Protection Authority Environmental Guidelines*: *Solid waste landfills - Second Edition* dated 2016 (the **Landfill Guideline**);

- The monthly landfill gas monitoring (as per the EPL for the Bioreactor) is conducted by an external contractor and includes the following:

    - CH_4 via Gazomat Inspectra Laser Portable Gas Leak Detector (or equivalent), which is calibrated using CH_4 span gas for a range between 10 ppm and 1,000,000 ppm with an uncertainty factor of ± 2%. The Inspectra Laser measures the concentration of total volatile organic compounds (recorded as methane equivalent) in air calibrated with a response factor of 1 for CH_4; and

    - H_2S via an MX6 iBrid Portable Multi-Gas Monitor or (equivalent), which is calibrated using a reference gas of H_2S at a known concentration of 25 ppm.

- Veolia continues to adopt the use of in-house monitoring via the following instruments:

    - CH_4 via a TDL-500 Laser Methane Gas Analyser that uses laser spectroscopy for the detection and measurement of CH_4 gas. The measurement range is 0 - 10,000 ppm. For surface gas monitoring from the Woodlawn Bioreactor, this measurement range is considered adequate, given that the typical accuracy for CH_4 detection threshold is 1 ppm (as indicated on the manufacturer's specification sheet). Given the instrument specification, it is considered suitable for surface gas monitoring of CH_4 where a detection threshold of 500 ppm or higher is required; and

- H_2S via a GfG G450 Gas Monitor. The measurement range is 0.1 - 10 ppm. The lower and upper measurement range for this instrument is considered suitable for surface gas monitoring of H_2S from the Woodlawn Bioreactor. A lower detection limit of 0.1 ppm (100 parts per billion, **ppb**) is considered appropriate given that the measurement will be conducted on the surface of the Woodlawn Bioreactor (i.e., the source gas emission release point). If off-site ambient measurements of H_2S is required, a lower detection limit of 3 ppb is recommended (reflecting the lowest detection limit for the continuous monitoring of H_2S currently available on the market).

- If CH4 is detected above 500 ppm and/or H_2S is detected above 1 ppm, the Trigger Action Response Plan (**TARP**) is activated. These thresholds are considered appropriate for the given surface gas monitoring requirements.

Based on this monitoring protocol and performance targets, the gridded monitoring domain did not measure the exceedance of CH_4 at 500 ppm or higher. However, H_2S was found to occasionally exceed 0.1 ppm. At the measured level of H_2S ranging between 0.1 ppm and 8 ppm, this does not account for downwind impacts at far distances from the Woodlawn Facility. This suggests that the odour types may not necessarily be sourced from waste material in the methanogenesis phase (i.e., aged waste in the upper layers) but rather in other stages of the anaerobic digestion process that are associated with volatile organic compounds, esters, volatile fatty acids, and other reduced sulphur compounds. Notwithstanding this qualification, the existing monitoring protocol is suitable for facilitating significant landfill gas leaks and maintaining a safe working environment within the Void.

9.2.1.3 Ambient H_2S Monitoring Findings by Others

The H_2S Study did not report ambient H_2S concentrations above the gas meter detection limit (3 ppb) at the nominated receptor locations. While it is noted that these results are heavily influenced by wind direction and dilution effects, H_2S measurements were reported below the H_2S ground-level criteria. Broadly, this is a similar finding to the H_2S monitoring program completed by the NSW EPA at nominated receptor locations (discussed in **Section 9.2.1.3.1**).

9.2.1.3.1 Ambient H_2S Monitoring by NSW EPA

The Audit has reviewed the H_2S data that is publicly available on the NSW EPA website (https://www.epa.nsw.gov.au/working-together/community-engagement/updates-on-issues/odour-investigations/tarago-odours) and considers that the event of detection and concentrations are very low and may have missed key odour events at these nominated receptor locations due to limitation of the instrumentation (i.e., H_2S is the target odour and 10-minute period between measurements). This is demonstrated in a frequency analysis summarised in **Table 9.4**. Also, the effects of interference from vehicle combustion and other anthropogenic emission sources are not apparent or qualified in this dataset, given the very low concentrations of detection. As such, the lived experience by the community at the monitoring locations may not have been accurately represented if H_2S is adopted as the sole key marker for an odour event (noting that the odour characteristics detected in the FAOA survey in the Audit and previous IOAs are related to skatoles, indoles, volatile fatty acids, ketones, aldehydes,

and reduced sulphur compounds, that are not readily amendable to continuous air quality monitoring). This sentiment appears to be supported by the frequency of logged complaints over the monitoring period, which has a higher frequency of occurrence compared with the frequency of detection by the H_2S instruments adopted in this monitoring program (refer to **Section 9.4.1**). The exception is the frequency of detection at Roseberry Street (9.9%), which may be considered significant if this data is further contextualised and qualified.

Table 9.4 – Frequency and Maximum Detection Concentration of H_2S monitoring program by NSW EPA

Monitoring Location	Maximum Detection Concentration (ppb)	Frequency of Detection (%)
Roseberry Street	31	9.9
Tarago Public School	3	0.03
Taylors Creek Road	3	0.03
IMF (Bungendore Road)	18	0.19
Collector Road	27	0.26
Crisp Creek	27	0.10
Braidwood Road	30	0.21

Notwithstanding the above, all things being equal, the data suggests that a plume emanating from the Bioreactor operations may have spread to these locations. To extract further meaning and facilitate sound data interpretation, the H_2S data collected as part of the NSW EPA monitoring program will need to be contextualised with prevailing wind conditions, date and time of detection between different locations, and correlated with landfill gas extraction and leachate extraction rates to facilitate in the interpretation of this data. Furthermore, consideration to other potential sources of H_2S that may cause interferences from the local environment need to be considered to improve confidence in the data and evaluate if H_2S as a tracer gas for odour emissions from the Woodlawn Facility can be relied upon as a sole parameter (refer to **Section 10.2.5.3**).

Overall, the H_2S monitoring data completed by others may facilitate in refining the ambient monitoring goals/targets, as the Audit does not consider, on the merit of technical evidence and operational experience, that the predominate or major issue in the community is solely attributable to H_2S from fugitive landfill gas emissions from the Void. This view is consistent with the sentiment extracted from the ambient data obtained in the H_2S Study as well as that completed by the odour monitoring program completed by the NSW EPA.

9.2.1.4 Air Quality and Greenhouse Gas Management

The Audit has reviewed the AQGGMP and considers that all relevant odour monitoring, management, and control protocols should be transposed and reflected in a separate document under the framework of a site-specific Odour Management Plan. It is understood that Veolia is in the process of preparing an Odour Management Plan (refer to **Section 10.2.1**), and the updates to the existing version of the AQGGMP will be concurrently completed. Once this is complete, the Odour Management Plan will be reviewed as part of the next IOA

9.2.1.5 Landfill Gas Combustion Exhaust Quality

According to the Emissions Testing Report and 2022 Emissions Testing Report (refer to **Appendix C**), all combusted gas emissions analysed on NSW EPA Point 8 - Generator No. 2 Exhaust Stack complied with the EPL Limits for NO_x, SO_3/H_2SO_4 and H_2S. The engine load at the time was reported to be 1,057.9 kilowatts (**kW**). The total hydrocarbon destruction efficiency was found to be greater than 98%, indicating efficient combustion of the landfill gas supply to the generators.

Given the outcomes reported in the Emissions Testing Report and 2022 Emissions Testing Report and provided the landfill gas engines continue to operate under optimal conditions, and there is no significant deterioration in combustion performance and operating temperature, the landfill gas engine exhaust stacks are not considered to be significant odour emission sources at the Woodlawn Facility. These results are consistent with the judgements made in the previous IOAs in that the engine stacks are a minor source of odour (given the operating combustion temperatures) and highly unlikely to result in adverse odour impact beyond the Woodlawn Facility boundary. This finding continues to remain valid in the Audit.

9.2.1.6 Improve Evaporation Capability

Veolia could recommence mechanical evaporation since this activity ceased following the 2012 IOA finding of the odorous quality of the leachate previously stored in ED3N lagoons. The background for this is well documented in the previous IOAs. The Audit observed that the mechanical evaporators are now active and automated to operate under specific ambient and wind conditions (refer to **Section 2.4.2.1**).

9.2.1.6.1 ED3N Pond System Evaporation and Odour Potential

The Audit finds that the quality of the treated leachate currently stored in ED3N pond system is modestly comparable to that observed in the previous IOA, where it was found to contain minimal odour emission potential and no evidence of untreated leachate character present in any of the samples collected (refer **Section 6.1.2**). This outcome indicates that the leachate treatment quality continues to be optimum and that the LMS at the Woodlawn Facility is performing very well from an odour emissions viewpoint. This finding is also consistent with the liquid test results that indicate the liquid odour potential if the liquid was to partition to the gas phase either by natural or mechanical evaporation processes. This is further discussed in **Section 9.2.1.6.2** and **Section 9.2.1.6.3**.

9.2.1.6.2 ED3S2 Pond System Evaporation and Odour Potential

The SOER input from the LMS May 2016 Report used a SOER of 0.159 ou.m^3/m^2.s for the modelling of ED3S2. The mean result derived from the Audit is 0.0526 ou/m^3/m^2.s (refer to **Table 6.2**). This result is below the modelled value and unlikely to cause any adverse impact beyond the boundary of the Woodlawn Facility, as demonstrated in the modelling documented in **Section 8**.

9.2.1.6.3 Status of Evaporation Capability from an Odour Viewpoint

The results derived using the LOM testing is summarised in **Table 6.6** The odour testing results found in the Audit, through conventional area source sampling and the

liquid odour measurement potential techniques, indicate very low SOERs and odour concentration values, respectively.

Overall, the Audit deduces that the pond sources at the Woodlawn Facility continue to be a minor source of odour at the Woodlawn Facility and are unlikely to cause adverse odour impacts beyond the boundary. Moreover, the stored contents in ED3N Pond System continue to be suitable for mechanical evaporation and is unlikely to result in adverse odour impact, provided the effluent quality continues to remain of high quality as found in the Audit. The adequate management of the LMS continues to be in the Audit as a mandatory recommendation (refer to **Section 10.2.3**).

9.2.1.7 The Implementation of Improved Capping Material in the form of a Biofilter Trial Program

The Audit found that the biofilter trial program has been extended and continues to be used as a means of managing odour emissions from the Void surface. The biofilter medium cover has shown that it can be effective at attenuating odour from fugitive emission pathways. However, proper management of the biofilter medium is necessary. This includes the regular watering and topping-up of biofilter medium as required. To achieve this, Veolia has developed an action strategy to streamline the management of this material. This is detailed in the Biofilter Trial Report and WIP 2020. The Audit endorses its continued use around high-risk areas prone to fugitive gas emission leaks, where required. Moreover, the use of alternative daily cover via the application of MWOO can also be utilised as it has the potential to improve the odour performance outcome from the surface operations of the Void and to manage fugitive odour emission release in conjunction with the continued use of biocover material.

9.2.1.8 Using the Minimal Active Tipping Face As Practically Possible

As identified in the previous IOAs, the active tipping face can vary depending on the tonnage input and how the waste is managed. Since the 2015 IOA, the exposed active tipping face was revised to reflect more realistic conditions that are prevalent in the Void (discussed further below). In addition to this, minimising the active tipping face continues to be one of the key performance indicators at the Woodlawn Facility for the following reasons (as outlined in previous IOAs):

1. Reduces the surface area of potential odour source;
2. Minimises temporary decommissioning of gas extraction infrastructure;
3. Minimises fuel usage, particularly in dozer and compactor; and
4. To meet NSW EPA benchmark techniques.

Photo 9.1 provides a visual indication of the active tipping face area size at the time of the Audit field visit. The original value adopted in the EA 2010 for the active tipping face was 40,000 m^2. This value was later revised to between 4,000 m^2 and 6,000 m^2 in the 2013 IOA to reflect realistic and previous operating conditions occurring at the time. As of the Audit, the current active tipping area is now approximately between 1,000 m^2 and 2,000 m^2, reflecting Veolia's continued efforts at minimising the active tipping face in the Void.

Veolia notes that changes to the tipping profile to maximise stormwater capture and removal has increased the active tipping face. It is expected leachate minimisation will have a larger material impact on odour compared to the minimisation of the active tipping area. This recommendation will be proactively pursed as soon as the desired Void surface profile changes have been achieved. Veolia notes that it is progressively moving to a tent shape from the current pyramid design (consistent with the outcome of the Leachate Assessment). Following the completion of the tent profile, consideration will be given to an east to west slope to allow stormwater removal.

The SOER value determined during this Audit was approximately 2.2 ou.m^3/m^2.s. This is lower than the SOER value used in the EA 2010 modelling of 7.6 ou.m^3/m^2.s. Based on these results and the outcome of the modelling study (refer to **Section 8**), there is a very low risk that the active tipping face will result in downwind odour impact on the nearest sensitive receptor. Moreover, this variation is considered to reflect normal variation from the active tipping face activity inside the Void. Notwithstanding this, it should be noted that:

- Fugitive landfill gas emissions are still judged to be the major contributor to odour emissions from the Void, as previously highlighted in **Section 9.2.1.2**; and

- Veolia has optimised operational practices such as the active tipping surface area is being kept to a minimum. This practice has a significant effect on the rate of emission from this source. That is, any reduction in the exposed waste surface area will result in a proportional decrease in emissions from the active tipping face, and vice versa.

The Audit finds that current practices at the Woodlawn Facility relating to the active tipping face are conducive to the minimisation of odour from this source.

Photo 9.1 - A distant view of the active tipping face area size as found on 22 March 2022

9.2.1.9 Water Cart to Control Dust

The use of the water cart is an ongoing operational activity, which is effective at minimising dust generation. This was visually evident during the fieldwork component of the Audit. The Audit observed that the operating practice of using a water cart to control dust continues to be an on-going practice at the Woodlawn Facility. On the above basis, no further action is required by Veolia for this component of the Woodlawn Facility's operations.

9.2.1.10 The Use of the Truck Wash Bay

The use of the truck wash bay at the Woodlawn Facility was observed to be consistently used by trucks upon exiting the Void. The consistent use of the truck wash bay is good practice at minimising potential odour emissions off-site that may be related to truck vehicle movement. Since the previous IOA, the truck wash bay has been optimised as follows:

- Wheel wash is continuously used for the clean the trucks coming out of the void and the performance of the wheel wash was monitored during operation; and
- Several of the spray nozzles have been modified and changed the spray angle to achieve better coverage (especially the tail of the truck) and washing

performance, as shown in **Photo 9.2.** This optimisation will minimise transient levels of odour that may be detectable and associated with truck movement in the community.

Photo 9.2 – Truck wash bay nozzle optimisation (**Source:** Previous 2019 IOA)

9.2.1.11 Transportation of Waste in Sealed Containers Until Unloading at the Bioreactor

Similar to the previous IOAs, the Audit has found that the current measures used for waste transport operations are very effective at mitigating any odour emissions. The IMF was inspected as part of the Audit and conducted a brief downwind olfactometry assessment to determine any presence of waste-based odour. The inspection did not find any evidence of any waste-based odour being emitted at the IMF. On this basis, the Audit determines that there is still no need to sample the IMF as it is very unlikely to generate problematic odour emissions. This is provided that the waste containers used in the process continue to be adequately maintained and remain fully sealed during waste transportation. As such, current practices should be continued and monitored. A photo of the IMF as found during the Audit on 24 March 2021 is shown in **Photo 9.3**.

Based on TOU observations, the Audit suggests that Veolia continue to review the following aspects relating to the transportation of waste in sealed containers to facilitate the minimisation of odour from this area/activity:

- The washing practice associated with the sealed containers; and
- The maintenance of the sealed containers.

Photo 9.3 - The IMF facing south-west as observed during the Audit inspection visit on 24 March 2022

9.2.1.12 The Minimisation of Leachate Generation During Stormwater Events

As indicated in **Section 2.5.2,** the WIP 2020, the surface water in the Void is managed in sub-catchments, as shown in **Figure 2.11** and **Figure 2.13**. Each sub-catchment has either a natural or engineered drainage and flow control infrastructure, such as concrete dish drains, clay berms, pumps, and pipes, to manage surface water. These sub-catchment areas are intended to minimise the amount of surface water flow from the Bioreactor walls onto the waste. This aims to minimise the potential generation of excess leachate from surface water flows.

9.2.1.12.1 Management of High Rainfall Events

As previously mentioned in **Section 2.5.2.2**, any stormwater into the Void, especially the portion that directly falls on the waste surface of the Void and the runoff from the upper benches, is one major source of excess leachate generation. As documented in the WIP 2020, it is indicated that leachate generation is very sensitive to high rainfall events due to the large, influencing catchment area and partial stormwater interception.

Large volumes of rainwater fall onto the waste surface during high rainfall events. Currently, stormwater is not 100% intercepted from the surface of the waste before becoming contaminated. Following high rainfall events, the leachate extraction system prioritises the extraction of surface water over leachate collected from the sub-surface

(i.e., below the surface of the Void and within the Bioreactor). As leachate extraction rate is limited to up to 4 L/s at the LTP, owing to the leachate treatment system capacity, these rainfall events result in further accumulation of leachate in the Bioreactor. This can have the effect of reducing the efficacy of the landfill gas capture infrastructure and management of fugitive landfill gas emissions from the Void. Given this treatment capacity, if a suitable monitoring and performance metric protocol is established, the capability of diverting diluted contaminated stormwater to one of the evaporation dams (i.e., ED3S and ED3N) will present an opportunity to mitigate the adverse impacts associated with high rainfall events on the landfill gas capture infrastructure and provide an improved odour outcome for the Woodlawn Facility under such circumstances.

Given the importance of the management of high rainfall events in the Void, the WIP 2020 indicates that continuous improvement of the stormwater management system is actively being undertaken as part of operational excellence and optimisation. This will remain integral to managing the Void and will be addressed as part of the annual IOAs. This view is consistent with that expressed in the Leachate Assessment, which states, "*…the amount of leachate extraction (sic) is dependent on the collection of clean stormwater to minimise (sic) recharge through the landfill waste which generates leachate*". This feature will continue to be examined as part of the IOA.

9.2.1.13 Effectiveness of Odour Controls at the MBT Facility

The MBT Facility consists of an extensive odour collection and control system to manage odour emissions throughout the composting process cycle. It was found that the biofilter performance was effective in substantially reducing odour prior to atmospheric discharge. However, it is known that biofiltration of this modern design can achieve further reduction if optimised. As such, the Audit notes that Veolia should operate and maintain the biofilter-based odour control system to the Biofilter Manual as part of best practice. As such, the Audit completed the following measurement of key performance metrics (as recommended in the previous IOA, including:

- Biofilter airflow;
- Inlet humidity levels and performance of the inlet air humidification system;
- Biofilter outlet performance (refer to **Section 6.1.9**); and
- Biofilter back-pressure.

9.2.1.13.1 Biofilter Physical Performance

The physical performance of the biofilter system at the MBT Facility was assessed during the Audit. The measurement results obtained in the Audit are as follows:

Biofilter 1

Inlet airflow: 80,000 m^3/hr, actual

InletTemperature (Dry/Wet Bulb): 30.7ºC / 20.9ºC

Inlet Relative Humidity: 42%

Moisture Content:	11.45 g H_2O per kg of dry air
Biofilter Back-Pressure:	+2,294 Pa (increase from +782 Pa since the 2020 IOA)

Comments: The inlet airflow and temperature for Biofilter 1 is within the design loading of 81,200 m^3/hr and less than or equal to 40^oC (based on the Biofilter Manual). However, the relative humidity level was significantly below the required performance target of 85% or higher. This low moisture condition can lead to bed dryness and sub-optimal odour removal performance.

Biofilter 2

Inlet airflow:	144,000 m^3 /hr, actual
Inlet Temperature (Dry/Wet Bulb):	34.5^oC / 26.6^oC
Inlet Relative Humidity:	55%
Inlet Moisture Content:	18.7 g H_2O per kg of dry air
Biofilter Back-Pressure:	+812 Pa (increase from +227 Pa since the 2020 IOA)

Comments: The inlet airflow and temperature for Biofilter 2 are within the design loading of 175,500 m^3/hr and less than or equal to 40^oC (based on the Biofilter Manual). However, the relative humidity level was significantly below the required performance target of 85% or higher. This low moisture condition can lead to bed dryness and sub-optimal odour removal performance.

Notwithstanding the above physical measurements and given the outcomes of the odour modelling study (refer to **Section 8**), the effectiveness of the odour controls at the MBT Facility will continue to be reviewed as part of the IOA to ensure operational excellence and continuous improvement is maintained at the MBT Facility.

9.2.1.14 Quality of Compost Product in the Maturation Storage Pad Area

The quality of compost product stored in the maturation storage pad area appeared to vary, with aged and screened material relatively lower in odour compared with aged and unscreened material. This suggests that compost product in the maturation storage pad area should be screened to minimise odour emission release from this area, or as a trigger response strategy under atypical scenarios as may be noticed by the operators. Notwithstanding this, the odour modelling predictions (refer to **Section 8**) indicates that the odour outcome is satisfactory under the conditions found in the Audit.

9.3 CONDITION 7 (C)

Condition 7 (C) of the Audit requirements stipulates that the following will be carried out in the IOA:

- *Review the proponents' production data (that are relevant to the odour audit) and complaint records.*

The production data that is relevant to the Audit include:

- Waste throughput to the Bioreactor;
- On-site evaporation data (from the 2012 IOA); and
- Landfill gas consumption in the generators and flare system.

This Audit obtained updated data relating to waste throughput to the Bioreactor, complaint records, and evaporation data from Veolia for the Woodlawn Facility since the previous 2020 IOA. These were reviewed as part of the Audit and are appended as **Appendix C** (with the exception of waste throughput that can be supplied with permission and upon request). The complaint log records indicate that the necessary fields required by the *EPL Condition M4 Recording of pollution complaints* are being documented by Veolia.

Based on the above, the Audit is satisfied that all relevant record-keeping duties continue to be adequately maintained.

9.4 CONDITION 7 (F)

Condition 7 (F) of the Audit requirements stipulates that the following will be carried out in the IOA:

- *Determine whether the project is complying with the requirements in this approval to protect receivers against offensive odour.*

This Audit has examined compliance or otherwise with *Condition 7(F)* from two perspectives, namely:

- Odour complaints data review and analysis and associated response from Veolia (discussed in **Section 9.4.1**); and
- Compliance with the modelling-based, project-specific odour performance goal of 6 ou (discussed in **Section 8**).

The above points have been discussed in **Section 9.4.1** and **Section 8,** respectively.

9.4.1 Odour Complaints Analysis and Response from Veolia

The odour complaints data logged by Veolia and associated response letters were reviewed and analysed in the Audit. **Figure 9.2** illustrates the seasonal distribution of logged odour complaints between 1 April 2021 and 5 April 2022. The odour complaints analysis indicated the following:

- Since the previous 2020 IOA, over the period of 1 April 2021 and 31 April 2022, there were 392 logged odour complaints, equivalent to a significant increase in

logged complaints and the highest since the commencement of the IOA at the Woodlawn Facility;

- The data appear to indicate that the autumn and winter period represent the highest incidence of logged complaints (representing 69% of the total);
- Veolia responded to each logged complaint over the period between 1 April 2022 and 5 April 2021. All responses can be found in **Appendix C**; and
- Veolia initiated the odour diary community feedback process in February 2021 in response to the high incidence of odour complaints. However, the Audit has reviewed the retrieved data from the collected diaries and it is not considered a suitable community feedback tool in its current form to provide valuable data (refer to **Section 10.2.5.1**).

With the above in mind, despite the significant improvement in landfill gas extraction in the Void and expansion and improvement in the LMS through optimisation of surface water catchments, landfill gas infrastructure design, active tipping practices and increased leachate treatment capacity via the commissioning of the LTP, the odour complaints trend appear to reflect the operational challenges associated with the high rainfall conditions over the Audit period (refer to **Section 9.2.1.12.1**). Given the high volume of complaints and vast spatial variability in the nature of the complaint, there is a statistical challenge with conducting a multivariant analysis of this data. Instead, the key message from the complaints data is that there is strong community concern about odour from the Woodlawn Facility and the lived experienced is related to the number of complaints. The likely contributing factors to this increase in complaints are clearly identified in the Audit, minimising the value of such analysis being undertaken. However, an ambient air quality gas composition analysis should be conducted to better understand the local airshed during unfavourable wind conditions. This has been included as a mandatory recommendation (refer to **Section 10.2.5.2**).

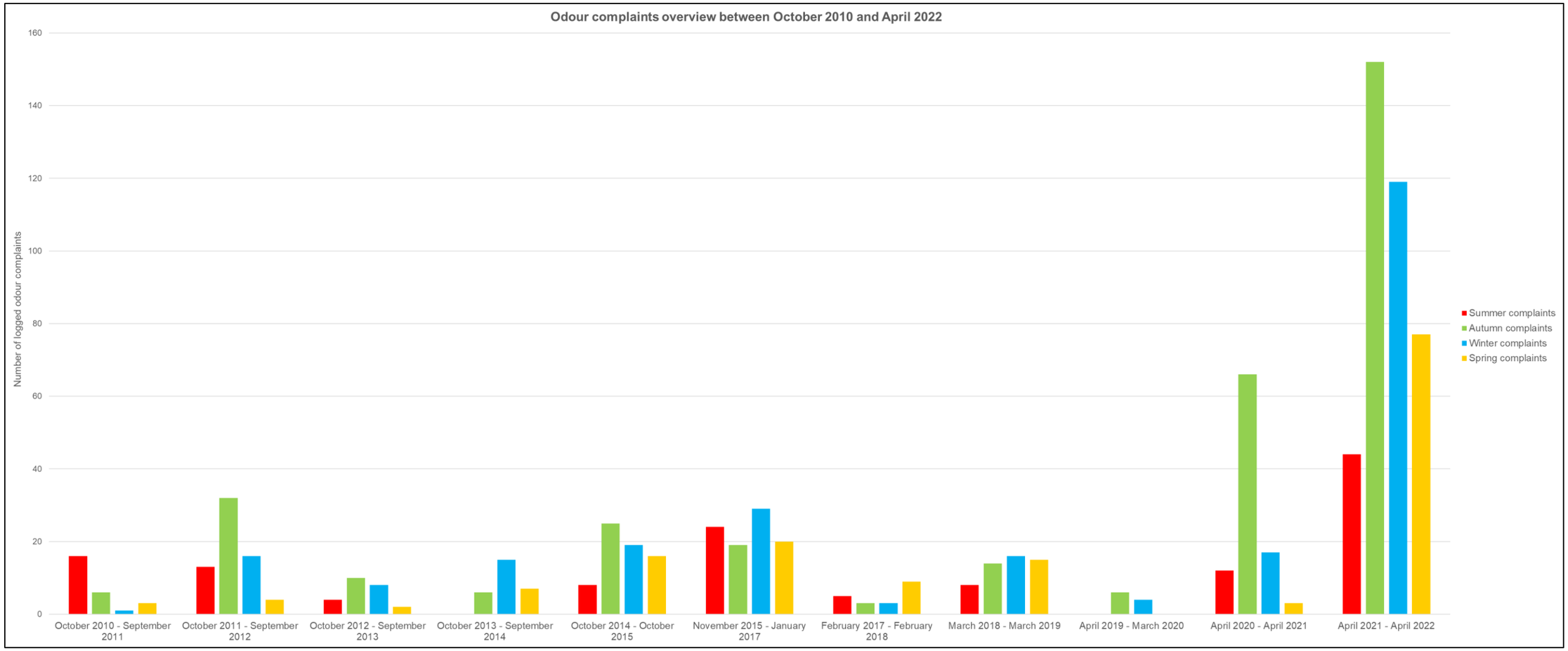

Figure 9.2 - Number of logged odour complaints between October 2010 and April 2022

9.5 ODOUR EMISSIONS INVENTORY DISCUSSION

As per the recommendation of the previous IOAs, the Audit recommends using an overall odour emissions inventory for the Woodlawn Facility and examining it to place the emissions from any single source into context.

Table 9.5 details the odour emission inventory for the Woodlawn Facility as determined by the testing carried out in the Audit and compared these results with predictions of emissions contained in the EA. It also makes a comparison with the impact of the revised areas (where applicable) for each odour emission source as found in the Audit.

It is acknowledged that there are odour emissions not listed in this inventory, emanating mostly from sources where quantitative measurement or even estimates are difficult. These include the fugitive odour releases from the Void, previously described as potential gas pathways, arising from gas leakages from the covered areas and around the walls of the Void and leachate recirculation air pressure relief vent. Despite these omissions, it is considered that the incomplete inventory remains to have real value and is discussed later (refer to **Section 9.5.2**).

Table 9.5 - Measurable odour emission rates for the Woodlawn Facility ^

	Parameters					The Audit		2020 Audit		2019 Audit		2018 Audit		2017 IOA		2016 IOA		2015 IOA		2014 IOA		2013 IOA			2012 IOA		EA		
Location	**Current Area (m^2)**	**2018 Area (m^2)**	**2016 Area (m^2)**	**2014 Area (m^2) ^^**	**2012 Area (m^2)**	**SOER ($ou.m^3/m^2.s$)**	**OER - Current Area ($ou.m^3/s$)^**	**SOER ($ou.m^3/m^2.s$)**	**OER - Current Area ($ou.m^3/s$)^**	**SOER ($ou.m^3/m^2.s$)**	**OER - Current Area ($ou.m^3/s$)**	**SOER ($ou.m^3/m^2.s$)**	**OER - Current Area ($ou.m^3/s$)**	**SOER ($ou.m^3/m^2.s$)**	**OER - Current Area ($ou.m^3/s$)**	**SOER ($ou.m^3/m^2.s$)**	**OER - Current Area ($ou.m^3/s$)**	**SOER ($ou.m^3/m^2.s$)**	**OER - Current Area ($ou.m^3/s$)**	**SOER ($ou.m^3/m^2.s$)**	**OER - Current Area ($ou.m^3/s$)**	**SOER ($ou.m^3/m^2.s$)**	**OER 2012 Area ($ou.m^3/s$)**	**OER - Current Area ($ou.m^3/s$)**	**SOER ($ou.m^3/m^2.s$)**	**OER ($ou.m^3/s$)**	**SOER ($ou.m^3/m^2.s$)**	**OER ($ou.m^3/s$)**	**OER - Current ($ou.m^3/s$)**
ED3N-1	n/a	7,500	6,000	6,000	7,000	2.57	3,691	n/m	n/m	n/a	n/a	0.356	2,670	0.132	792	0.130	780	0.132	794	0.017	104	0.30	2,100	1,800	394	2,760,000	8.8	61,600	52,800
ED3N-2 & 3 ^^^	14,000	12,400	11,000	11,000	13,000	0.877	12,300	0.361	4,440	0.0745	1,060	0.102	1,260	0.129	1,420	0.175	1,930	0.118	1,300	0.049	543	11.6	150,000	127,000	0.29	3,800	7.4	96,200	81,400
ED3N-2	7,250	7,000	5,500	5,500	6,500	1.72	12,500	0.0867	527	0.0881	710	0.169	1,180	0.120	660	0.148	811	0.145	797	0.066	365	20.1	131,000	111,000	0.21	1,350	n/a^^^		
ED3N-3	6,750	5,400	5,500	5,500	6,500	0.0349	236	0.635	3,960	0.0609	379	0.035	190	0.139	765	0.20	1,110	0.091	500	0.032	178	0.2	1,010	852	0.37	2,430			
ED3N-4	36,600	39,000	25,000	25,000	16,000	0.045	1,780	0.522	19,100	0.0856	3,440	0.095	3,710	0.163	4,080	0.248	6,200	0.269	6,720	0.023	575	0.0604	966	1,510	0.41	6,600	0.7	11,200	17,500
ED3S1 (formerly ED3S)	71,500	89,400	89,435	n/a		n/m	6,720	n/m	n/m	0.094	0.094	7,250	5,190	0.116	10,400	0.277	24,700	No previous measurements available as ED3S & ED3S-S are new sources									0.5	44,700	24,700
ED3S2 (formerly ED3S-S)"	22,100	19,000	1,420			0.0526	1,160	2.19	44,000	0.554	0.554	10,600	2,550	1.97	44,700	0.437	621										0.159	4,510	226
ED1 Coffer Dam	64,700	n/a				0.0372	2,410	n/m																			n/a		
Active Tipping Face	2,000	2,000	6,000	6,000	40,000 *	2.20	4,400	3.24	6,480	5.26	10,500	7.59	15,200	9.52	14,300	8.16	49,000	7.51	45,100	4.28	25,700	3.04	122,000	18,200	8.36	334,000	7.3	292,000	43,800
LTD	3,970	5,000	5,000	5,000	2,000	0.415	1,650	3.07	12,600	9.19	38,300	0.186	930	0.243	1,220	0.27	1,350	0.276	1,380	0.026	129	0.323	647	1,620	0.46	920	3.6	7,200 #	18,000
Construction and Demolition Tip Face	900	900	900	500	900	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.326	294	n/a^	n/a	0.293	264	147	n/a	n/a	n/a	n/a	n/a
Storage Pond 7	n/a	n/a	n/a	n/a	1,200	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/m^^	n/a	n/m	n/m	n/m	85	102,000	n/m	n/m	n/m

n/a = not applicable. Note: ED3N-1 is empty
n/m = not measured
^ All odour emission rates represent the derived mean SOER values for each location
^^ As advised by Veolia
^^^ reported in the EA 2010 as a single emission source i.e. ED3N-2 & ED3N-3 as a single area
* as reported in the EA 2010
** Target SOER not obtained from the EA. Source of emission data is the LMS May 2016 Report: Table 2.1. For ED3S-S the current surface area as of the Audit is reported to be 82% of total capacity (20,100 m^2)

Based on the result in **Table 9.5**, the following comments are made (excluding the MBT Facility and LTP):

- The total measurable odour emission rate from the Woodlawn Facility found in the Audit was 37,700 ou.m^3/s, representing a moderate described since the 2020 IOA (91,100 ou.m^3/s). The dominant contributor to this result appears to be the increase in OER from ED3N Pond System;

- The active tipping face and waste covered areas are within normal trends for total measurable odour emissions from the Void and without consideration of fugitive landfill gas emissions;

- The Leachate Management System (**LMS**) continues to operate under low odour emission conditions and is unlikely to be contributing to any significant odour impact beyond the Woodlawn Facility boundary, despite the observed OERs for ED3N Pond System;

- From a comparative viewpoint, the specific odour emission rate (**SOER**) results show moderately close agreement between the Audit results and the original EA 2010 odour dispersion modelling study used in the *Odour and Dust Impact Assessment (Rev 5) Report* dated 2 August 2010 (**EA 2010**) value for all emission sources, apart from a single result for ED3N-1. This is a significant result as it shows that the **SOER** predictions in the EA 2010 continue to be suitable for current and future operations at the Woodlawn Facility. This is supported by the odour modelling analysis conducted in the Audit;

- Similar to previous IOAs, ED3N-2 & ED3N-3 has been reported both as separate emission sources and a single source (as per the EA 2010) to determine the relative contribution of odour emission from each pond; and

- ED1 Coffer Dam is included in the overall site emissions profile analysis and will form part of future IOAs.

The following sections discuss the results from the odour emissions inventory and Audit in the context of the pond and non-pond sources (refer to **Sections 9.5.1** & **9.5.2,** respectively).

9.5.1 Pond sources

All pond sources at the Woodlawn Facility sampled in the Audit are considered area sources, including:

- ED3N Pond System: this includes ED3N-1, 2, 3 and 4;

- ED3S Pond System: this includes ED3S1 and ED3S2;

- ED1 Coffer Dam;

- LTD; and

- LTP

The following sections discuss each of the above pond sources.

9.5.1.1 ED3N Pond System

In the context of the odour emissions inventory for the Woodlawn Facility, the Audit finds that at the current and above performance targets for leachate quality, leachate effluent stored in ED3N represents very low odour emissions since the IOAs began in 2011. The derived mean SOER's for ED3N-2, 3 & 4 in the Audit is 0.0867 ou.m^3/m^2.s, 0.635 ou.m^3/m^2.s, and 0.522 ou.m^3/m^2.s, respectively. At these values, the stored contents of ED3N continue to be a minor odour emission source at the Woodlawn Facility.

On the above basis, the Audit finds that the leachate performance targets set by Veolia are appropriate in attenuating odour emissions from pond-related sources. It can be considered that any significant deviation of the leachate quality monitoring targets would be a reasonable indicator that there will be an increase in risk potential for odour emission generation from the ED3N Pond System. This risk potential is significantly mitigated with the commissioning of the LTP.

9.5.1.2 ED3S Pond System

9.5.1.2.1 ED3S1

In the context of the odour emissions inventory for the Woodlawn Facility, the Audit finds that the current and above performance targets for stormwater quality stored in ED3S represent very low odour emissions since the IOAs began in 2011. As such, it was not sampled as part of the IOA unless operational conditions are to vary in the future.

9.5.1.3 ED3S2

The SOER input from the LMS May 2016 Report used a SOER of 0.159 ou.m^3/m^2.s for the modelling of ED3S2. The mean result derived from the Audit is 0.0526 ou.m^3/m^2.s (refer to **Table 6.2**). This result is lower than the modelled value and is, therefore, unlikely to cause any adverse impact beyond the boundary of the Woodlawn Facility, given the odour modelling analysis and results of the FAOA surveys conducted as part of the Audit.

9.5.1.4 LTD

The LTD was found to be operating under normal conditions. As such, the SOER derived in the Audit from this source was found to be 0.415 u.m^3/m^2.s, which is consistent with the EA 2010 value of 3.6 ou.m^3/m^2.s. Furthermore, given the odour modelling results and the nature of the source, the LTD continues to be unlikely to lead to adverse impacts downwind of the Woodlawn Facility at nearby sensitive receptors to the Woodlawn Facility.

9.5.1.5 LTP

The LTP was found to be operating under normal conditions. If we include ED1 Coffer Dam as part of the LTP (refer to **Table 8.2**), the overall odour emission profile is 2,500 ou.m^3/s. This is very low relative to other sources at the Woodlawn Facility and unlikely to lead to off-site odour impact. Furthermore, given the odour modelling results and nature of the source, the LTP is expected to continue to be unlikely to lead to adverse

impacts downwind of the Woodlawn Facility at nearby sensitive receptors to the Woodlawn Facility.

9.5.2 Non-pond sources

The activities within the Void were judged to be similar regarding process operations to those found in the 2016 IOA, except for the landform adopted for the active tipping face within the Void (refer to **Section 9.2.1.7** for details). The Audit endorses the continued use of biofiltration cover material around high-risk areas prone to fugitive gas emission leaks, where required. If possible, alternative cover material can also be adopted via the use of biocover or MWOO material (refer to **Section 9.2.1.2.1.1**).

In summary, the Audit odour testing results suggest that the Void continues to remain the major contributor to odour emissions at the Woodlawn Facility through fugitive gas emissions if landfill gas extraction is not effectively maintained. The fugitive landfill gas emissions that arise due to wall effects and cracks in the capping of waste, particularly near landfill gas extraction wells and Void perimeter and impacts of high rainfall events, are an on-going operational challenge at the Woodlawn Facility (refer to **Section 9.2.1.2.1** and **Section 9.2.1.12.1**). As outlined in previous IOAs and a report titled *Leachate Assessment at Woodlawn Bioreactor* dated 3 August 2021 (the **Leachate Assessment**), the management of high rainfall events and its impact on the Bioreactor operations represent the current and dominant operational challenge from an odour management perspective at the Woodlawn Facility. As such, the Audit continues to support the development of a strategy and engineering design that focuses on reducing leachate generation by diverting and extracting stormwater. This is a more effective and achievable goal than increasing leachate extraction rates through the LMS, especially during high rainfall or frequent storm events. As also outlined in the Leachate Assessment, a leachate management strategy comprising high flow extraction of stormwater/slightly impacted stormwater, flexible leachate extraction rates, and maximising extractions during summer months for evaporation dams will be beneficial for managing leachate levels in the Bioreactor. Put simply, fugitive emission pathways from the Void surface remain the current focus at the Woodlawn Facility from an odour management perspective (refer to **Section 10.2.2**).

9.5.3 Active Tipping Face

For reasons discussed in **Section 9.2.1.8**, the mean SOER result of 3.24 ou.$m^3/m^2.s$) from the active tipping face as found in the Audit is not considered significant from an odour impact viewpoint but demonstrates the importance of continued efforts to minimise the active tipping face as much as practically possible. Overall, the Audit finds that current practices at the Woodlawn Facility in relation to the active tipping face are conducive to the minimisation of odour from this source.

10 AUDIT RECOMMENDATIONS

10.1 CONDITION 7 (G & H)

The following section is designed to address the following Audit requirement:

- *Outline all reasonable and feasible measures (including cost/benefit analysis, if required) that may be required to improve odour control at the Woodlawn Facility; and*
- *Recommend and prioritise (mandatory and non-mandatory) recommendations for their implementations.*

Based on the findings from this Audit, the following mandatory and non-mandatory measures have been recommended.

10.2 MANDATORY RECOMMENDATIONS

The mandatory recommendations in this Audit revolve around the increase in the number of odour complaints, the leachate management system, the continuation of odour mitigation from the Void and optimisation of the odour control infrastructure servicing the MBT Facility. These have been discussed in the following sections.

10.2.1 Odour Management Plan

The preparation of a site-specific odour management plan for the Bioreactor and MBT operations that documents the following features as a minimum:

- Accepted waste streams and description of process operations;
- Standard operating procedures (SOP) that are employed in each key process area to anticipate the formation of emissions and minimise their potential impact on the local airshed (e.g., failure of pump equipment and/or high rainfall events);
- An outline of how the production and migration of emissions is minimised at the Woodlawn Facility, including design (where applicable) and operating practices;
- The monitoring and control protocols required to assist in the management of emissions;
- Critical odour emissions risk and control points;
- An outline of the key staff and responsibilities with respect to odour management; and
- An outline of the reporting requirements with respect to emissions present

Put simply, the sole purpose of the Odour Management Plan is to eliminate, prevent or minimise the potential release of adverse levels of air pollutants and odour at the Woodlawn Facility through a documented hierarchy of controls, in the form of, but not limited to, engineered, administration and/or management practices. The Odour

Management Plan target will seek to find a practical balance between maintaining the quality of process operations designed to yield continuous improvement and operational excellence and the ability to control emissions to air. The Odour Management Plan will develop the link and/or consolidate existing management plans and strategies with respect to odour from the Bioreactor and MBT Facility operations, as required.

10.2.2 Odour Mitigation from the Void

There are two critical areas of focus with respect to odour mitigation from the Void, namely:

1. Fugitive landfill gas emissions; and

2. Management of high rainfall events

These two areas are discussed in **Section 10.2.2.1** and **Section 10.2.2.2**, respectively.

10.2.2.1 Fugitive landfill gas emissions

As mentioned in the Audit, the high rainfall conditions over the assessed period have impacted the efficacy of gas emissions containment and capture, with fugitive emissions pathways anecdotally more prevalent than the previous IOA. This is supported by the increase in complaints and results of the FAOA surveys in the Audit (despite a 12% increase in landfill gas extraction since the previous IOA, predominately due to the installation and commissioning of the Flare 3 System). Therefore, Veolia should continue to manage fugitive landfill gas pathways from the surface using the existing toolkit, such as biocover material and perhaps research and trial novel techniques.

Furthermore, Veolia should also continue its mission of enhancing and accelerating its improvement to landfill gas capture from the Bioreactor as reasonably practicable. This continuation is apparent in the WIP 2020, which outlines a comprehensive plan that is being implemented to increase gas capture. The WIP 2020 also clearly seeks to address current areas of concern and the potential solution outcomes that can be implemented. This is an active (and effective) management approach that will continually improve gas capture efficiency and ultimately reduce odour/landfill gas emissions from the Void. It will also assist Veolia in navigating through the high incidence of high odour complaints and impacts from fugitive emissions from the Void surface. As such, the Audit endorses this strategy as the primary measure to reduce odour emissions from the Void and recommends that Veolia continues the implementation of the gas systems detailed in the WIP 2020 and WIPS5 2022, including:

- The augmentation of additional pipework and booster/flare/engine to the current capacity at the Woodlawn Facility. In principle, the addition of the power station engines will increase landfill gas usage capacity, further facilitate the optimisation and minimisation of fugitive landfill gas release from the Void surface;

- the planned infrastructure instalments within each waste lift;

- the continuous improvement of leachate extraction, treatment performance, capacity, and efficiency. This is supported by the implementation of the long-term leachate solution in the form of the LTP, which remains in the process-proving and optimisation phase of operation;

- the continuous improvement in the waste tipping profile, covering and expansion and optimisation of the landfill gas infrastructure;

- the continuous monitoring of leachate and gas extraction;

- remediation actions in the event of equipment failure and process upset in the Void;

- continuous awareness of condensate management;

- the implementation of operational management programs, including:

    - Leachate management;

    - Pumps and pumping solutions; and

    - The expansion of wells in the Void for improved/minimisation of leachate recirculation and landfill gas extraction.

- application of biocover material to manage fugitive landfill gas emissions, as outlined in the WIP 2020.

It should be noted that the WIP 2020 is a live document that is continually updated. Therefore, it will continue to remain a part of the IOA.

10.2.2.2 Management of High Rainfall Events

As outlined in previous IOAs and the Leachate Assessment, the management of high rainfall events and its impact on the Bioreactor operations represent a current operational challenge at the Woodlawn Facility. As such, the Audit continues to support the development of a strategy and engineering design that focuses on reducing leachate generation by diverting and extracting stormwater. This is a more effective and achievable goal compared with increasing leachate extraction rates through the LMS, especially during high rainfall or frequency storm events. As outlined in the Leachate Assessment, a leachate management strategy comprising high flow extraction of stormwater/slightly impacted stormwater, flexible leachate extraction rates, and maximising extractions during summer months for evaporation dams will be beneficial for managing leachate levels in the Bioreactor.

Furthermore, given that ED1 Coffer Dam has approached 80% volume capacity, the acceleration of progressive leachate management strategy is timely and approach. The Audit agrees with the recommendations made in the Leachate Assessment to achieve this desired outcome, and they should be implemented as soon as practicable.

10.2.3 Leachate Management System

Veolia should continue to adequately maintain, manage, monitor the upgraded LMS to ensure it is operating in an optimum state and meeting the leachate quality monitoring targets as outlined in the *Leachate Treatment Operation Manual* and recommended by Veolia Water. Moreover, the performance goals outlined in the WIP 2020 should continue to be pursed and materialised. In combination with the recommendation in **Section 10.2.2.2**, the performance targets for the LMS should include:

- Maximising and optimising leachate extraction from the Bioreactor to meet the design treatment capacity and capability of the existing infrastructure;
- Minimising leachate generation by:
- Continuation of the existing stormwater diversion program at the Woodlawn Facility;
- For high rainfall events, develop acceptable limits for which contaminated but highly diluted stormwater can be rapidly diverted to stormwater storage, minimising leachate generation and pooling in the Void surface. The stormwater event should be designed with consideration of recent and atypical rainfall events brought about by La Niña and climatical impacts and contingency; and
- Develop and establish a simple and reliable monitoring and performance metric protocol that enables the capability of diverting diluted contaminated stormwater to one of the evaporation dams (i.e., ED3S1, ED3S2, or ED3N) or alternative contingency pond storage dedicated for contaminated stormwater. This will present an opportunity to further mitigate the potential adverse impacts on the landfill gas capture infrastructure and ultimately provide an improved odour outcome under such circumstances.

10.2.4 Active Tipping Face

Veolia should continue to develop strategies for minimising the exposed ATF surface area. It should also proceed and continue with the details in the WIP 2020. The Audit notes that changes to the tipping profile to maximise stormwater capture and removal (refer to **Section 10.2.3**) have increased the footprint of the ATF. The target of leachate minimisation through stormwater diversion and management will have a larger material impact on odour compared to the minimisation of the active tipping area, given its impact on fugitive gas emission release and landfill gas capture. The Audit notes that Veolia notes that it is progressively moving to a tent shape from the current pyramid design (consistent with the outcomes of the Leachate Assessment). Following the completion of the tent profile, consideration will be given to an east-to-west slope to allow stormwater removal.

10.2.5 Refine Investigation of Odour Issues in the Community

Given the significant increase in odour complaints documented in the Audit, the Audit recommends that Veolia continues with its community engagement and liaison process. This is understood to include continued community engagement through various groups (i.e., Tarago and District Progress Association Inc (**TADPAI**), Tarago Times publications

& Community Liaison Committee, Open days). Furthermore, in view of the limited efficacy of ambient H_2S monitoring with existing sensory technology (as outlined in **Section 9.2.1.3**), the Audit recommends calibration and training of Veolia staff in the undertaking of field ambient odour assessment surveillance surveys to provide an additional tool in the TARP (refer to **Section 9.2.1.2.1.2** for details) in lieu of the odour diary program (refer to **Section 10.2.5.1**). Veolia should also continue to log and monitor odour complaints in the current odour complaints register.

10.2.5.1 Status of Odour Diaries

It is understood that the reinstatement of the odour diary program occurred in February 2021. The Audit has reviewed the retrieved data from the collected diaries and it is not considered a suitable community feedback tool in its current form to provide valuable data. As such, the odour diagram program should be discontinued unless participating community members are professional trained on its use and data entry protocols.

10.2.5.2 Ambient Landfill Gas Composition Laboratory Analysis

Given the findings of the FAOA survey are incongruent with the dispersion modelling (predominately due to the unquantifiable nature of fugitive emission pathways within the Void surface), a landfill gas composition analysis should be completed to provide technical feedback on the gas analytes present of the landfill gas released to the ambient environment from uncontrolled gas emission release points from the surface of the Void at the Woodlawn Facility. The objective of the landfill gas composition analysis will be to identify the gas analytes present, with a focus on characterising those gas compounds that are known to be odorous, including but not limited to sulphur gases and volatile organic compounds. This data may facilitate in refining the ambient monitoring goals/targets, as the Audit does not consider, on the merit of technical evidence and operational experience, that the predominate or major issue in the community is solely attributable to H_2S from fugitive landfill gas emissions from the Void. This view is consistent with the sentiment extracted from the ambient data obtained in the H_2S Study as well as that completed by the odour monitoring program completed by the NSW EPA.

10.2.5.3 NSW EPA H_2S Monitoring Program Data Interpretation

To extract further meaning and facilitate sound data interpretation, the H_2S data collected as part of the NSW EPA monitoring program will need to be contextualised with prevailing wind conditions, date and time of detection between different locations, and correlated with landfill gas extraction and leachate extraction rates to facilitate in the interpretation of this data. Furthermore, consideration to other potential sources of H_2S that may cause interferences from the local environment needs to be considered to improve confidence in the data and evaluate if H_2S as a tracer gas for odour emissions from the Woodlawn Facility can be relied upon as a sole parameter. This will be completed as part of a separate study to the Audit and before the next IOA.

10.2.6 Odour Mitigation from the MBT Facility

The Audit recommends a heightened awareness of the operability and maintenance of the biofilter-based odour control system at the MBT Facility, which should be consistent with the Biofilter Manual to ensure optimal and sustained odour removal performance. It is recommended that the MBT Facility improve its overall management of biofilter bed moisture to ensure optimum odour removal performance. This can be achieved by an

intensification of the surface drip irrigation system and/or optimisation of the current spray humidification system. Based on the physical and odour measurement data obtained during the Audit, the requirement for a biofilter refurbishment should be considered within the next 12 months or earlier. A biofilter condition and performance assessment can be completed to support the case for a refurbishment if required.

The LAP should also be improved for further optimise leachate quality within the LAP system at the MBT Facility.

10.3 NON-MANDATORY RECOMMENDATIONS

The non-mandatory recommendations in this Audit revolve around odour mitigation strategies for the Void, odour complaints, and fugitive gas emissions from the Void only.

10.3.1 IMF and Waste Transport Activities

Based on TOU observations, the Audit suggests that Veolia continue to review the following aspects relating to the use of the IMF and waste transport activities to further improve its odour performance as a minor and transient source of odour, namely:

- The washing practice associated with the sealed containers; and
- The maintenance of the sealed containers.

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Veolia Australia & New Zealand

Woodlawn Bioreactor Expansion Project

Independent Odour Audit #10

October 2022

Appendices

APPENDIX A:

RECORD OF CORRESPONDENCE WITH NSW EPA & DPE

Michael Assal

Subject: FW: Veolia Woodlawn Bioreactor Odour Audit #10 (DA 10_0012) - Consultation

From: Michael Assal <massal@odourunit.com.au>
Sent: Thursday, 24 February 2022 6:27 PM
[redacted]
Subject: Veolia Woodlawn Bioreactor Odour Audit #10 (DA 10_0012) - Consultation
Importance: High

To whom it may concern,

RE: Woodlawn Bioreactor Facility Odour Audit #10

Relevant Background

We, The Odour Unit (**TOU**), have been engaged by Veolia Environmental Services (**Veolia**) to conduct the tenth (10th) independent odour audit (the **Odour Audit**) at the Woodlawn Bioreactor Facility, Tarago, NSW (the **Woodlawn Facility**). In accordance with the project approval requirements outlined in *Condition 7* of *Schedule 4* in the *Specific Environmental Conditions - Landfill sites* (DA 10_0012), which states that we need to "*Consult with the Environment Protection Authority (EPA) and the Department of Planning, Industry and Environment (DPIE)",* please regard this email as our **formal** notification for consultation with the relevant regulatory departments for the Odour Audit.

The Odour Audit Proposal

Please find **attached** our proposal as addressed and issued to Veolia for the undertaking of the Odour Audit at the Woodlawn Facility. The attached proposal details our scope of works, the audit team, deliverables, timeframe and other details relating to the undertaking of the Odour Audit.

Consultation Timing

As you will gather from the attached proposal, we have scheduled the fieldwork component of the Odour Audit to be completed between **14 March 2022** and **17 March 2022** . As such, it will be appreciated if we could receive any advice or feedback on or before close of business **Wednesday, 9 March 2022.**

We look forward to hearing from you soon.

Please do not hesitate to contact us if you have any enquiries.

Regards,

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

THE ODOUR UNIT

The Odour Unit Pty Ltd
[redacted]

[redacted]

Michael Assal

Subject: FW: Veolia Woodlawn Bioreactor Odour Audit #10 (DA 10_0012) - Consultation

[redacted]

Sent: Thursday, 24 February 2022 6:27 PM
To: Michael Assal <massal@odourunit.com.au>
[redacted]

Thank you for contacting Environment Protection Authority (EPA). Your email has been received and will be processed by the responsible officer in due course.

This email address is monitored Monday to Friday during business hours 8:30 am to 4:30pm excluding public holidays.

If your matter is urgent, or relates to an Incident or after-hours pollution emergency, please contact our Environmental Line on 131 555.

This message has been created automatically. You do not need to respond to this message.

Michael Assal

Subject: FW: Veolia Woodlawn Bioreactor Odour Audit #10 (DA 10_0012) - Consultation

[redacted]
Sent: Monday, 14 March 2022 1:38 PM
To: Michael Assal <massal@odourunit.com.au>; [redacted]
Subject: RE: Veolia Woodlawn Bioreactor Odour Audit #10 (DA 10_0012) - Consultation

Hi Michael,

Thank you for consulting the Department on the requirements for the independent odour audit of the Woodlawn Bioreactor Facility.

In addition to the consent condition outlining the requirements for the independent odour audit, the Department concurs with the requirements provided by the EPA on 11 March 2022.

Kind Regards,
[redacted]

[redacted]

Compliance | Department of Planning and Environment
[redacted]
PO Box 5475, Wollongong NSW 2520
www.dpie.nsw.gov.au

The Department of Planning and Environment acknowledges that it stands on Aboriginal land.
We acknowledge the traditional custodians of the land and we show our respect for elders past, present and emerging through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places in which Aboriginal people are included socially, culturally and economically.

Please note that I work flexibly. I'm sending this message now because it's a good time for me, but I don't expect that you will read, respond to or action it outside of your own regular hours.

If you are submitting a compliance document or request as required under the conditions of consent or approval, please note that the Department is no longer accepting lodgement via compliance@planning.nsw.gov.au.

The Department has recently upgraded the Major Projects Website to improve the timeliness and transparency of its post approval and compliance functions. As part of this upgrade, proponents are now requested to submit all post approval and compliance documents online, via the Major Projects Website. To do this, please refer to the instructions available here.

Department of Planning and Environment

Ms Marea Rakete
Woodlawn Environmental Officer
Veolia Environmental Services (Australia) Pty Ltd
619 Collector Road
TARAGO NSW 2580

02/03/2022

Dear Ms Rakete

Woodlawn Waste Expansion Project (MP 10_0012)
Annual Independent Odour Auditor 2022

I refer to your request of 25 February 2022 seeking approval of Messrs Terry Schulz, Michael Assal and Steven Hayes of The Odour Unit Pty Ltd (the audit team) for the upcoming Annual Independent Odour Audit of Woodlawn Waste Expansion Project (the project), in accordance with Schedule 4, Condition 7 of the project approval MP 10_0012, as modified (the approval).

Having considered the qualifications and experience of the audit team, the Secretary endorses the appointment of the audit team to undertake the Annual Independent Odour Audit in accordance with Schedule 4, Condition 7 of the approval. This approval is conditional on the audit team being independent of the project.

The audit is to be conducted in accordance with AS/NZS ISO 19011 Australian/New Zealand Standard: Guidelines for quality and/or environmental management systems auditing. Auditors may wish to have regard to the Independent Audit Guideline dated May 2020. A copy of this guideline can be located at https://www.planning.nsw.gov.au/-/media/Files/DPE/Other/Assess-and-regulate/About-Compliance/independent-audit-post-approval-requirements-2020-05-19.pdf.

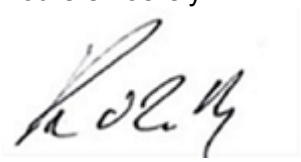
The audit report is to include the following:

1. consultation with the relevant agencies;
2. a compliance table indicating the compliance status of each condition of approval and any relevant EPL;
3. not use the term “partial compliance”;
4. recommend actions in response to non-compliances;
5. review the adequacy of plans and programs required under this consent; and
6. identify opportunities for improved environmental management and performance.

Within six weeks of the completion of the Annual Independent Odour Audit, Veolia is to submit a copy of the audit report to the Secretary, together with its response to any recommendations contained in the audit report and a timetable to implement the recommendations. Prior to submitting the audit report to the Secretary, it is recommended that Veolia review the report to ensure it complies with the relevant approval condition.

Should you need to discuss the above, please contact Georgia Dragicevic, Senior Compliance Officer, on (02) 4247 1852 or by email to Georgia.Dragicevic@planning.nsw.gov.au.

Yours sincerely



Katrina O'Reilly
Team Leader - Compliance
Compliance
As nominee of the Planning Secretary

DOC22/145599-1

The Odour Unit
Level 3, 12/56 Church Avenue
MASCOT NSW 2020
email: massal@odourunit.com.au

11 March 2022

Dear Sir

Woodlawn Landfill – Odour Audit #10 Consultation

I am writing in response to your email to the Environment Protection Authority (EPA) dated 24 February 2022 requesting feedback and advice on the Independent Odour Audit (#10).

The EPA provides advice in the attachment to this letter (**Attachment A**). This advice relates to the following matters:

- Measurement of all key odour sources
- Offensive odour at receptors
- Review complaint records
- Review Air Quality and Greenhouse Gas Management Plan
- Recommendations to improve odour control
- Reviewing and reporting

If you have any questions regarding the above, please contact Vanessa O'Keefe on 0488 433 384 or at info@epa.nsw.gov.au.

Yours sincerely

PETER BLOEM
Manager Regulatory Operations

ATTACHMENT A

Measure of all Key Odour Sources

The Independent Odour Audit condition (e) requires the audit to:

> *(e) measure all key odour sources on site including:*
>
> *i. consideration of wet weather conditions providing all raw sampling data used in this analysis;*
>
> *ii. consideration of (but not limited to) all liquid storage areas, active tipping faces, waste cover area, aged waste areas and recirculation of leachate onto waste in the void; and*
>
> *iii. a comparison of the results of these measurements against the predictions in the EA;*

A thorough air emissions inventory for the premises should be undertaken which identifies all sources of air pollution, the air pollutants emitted from each source, and estimates the emission concentration and rate of all air pollutants emitted. Please refer to our Approved Methods for the Modelling and Assessment of Air Pollutants in NSW and Technical framework: Assessment and management of odour from stationary sources in NSW for further advice.

The audit should clearly identify any gaps in knowledge, assumptions and limitations in the information provided and the steps that will be taken to address these uncertainties.

Emissions from the premises should be demonstrated to comply with the requirements of the EPL and any relevant environment protection regulations.

Some points to consider regarding odour sources (from Odour Audit #9) are as follows:

- Odour sampling was generally undertaken at the same sources and using the same methods as previous years odour audits.
- Some potential odour sources were not sampled due to safety or accessibility issues.
- The Odour Audit incorrectly states that all samples collected from the ED3N pond system were below the 2010 SOER model inputs except for SC21126. Only one of the three samples from ED3N-3 were below the 2010 modelled inputs,
- The odour concentrations from all measured pond systems have increased from previously measured odour concentrations (2020 IOA). The Leachate Treatment Dam (LTD) odour emission rates are significantly lower than previously measured (2020 IOA).
- Six samples were collected in the waste covered area in the Bioreactor and three from the active tipping face. The adequacy of this level of sampling to generate representative emission data should be reviewed. This should draw on knowledge gained from the surface landfill gas monitoring and other site investigations and reporting.
- The potential for emissions from the Leachate Treatment Plant (LTP) itself does not appear to have been considered. The LTP is undergoing proving and the risk of odours from storage and treatment processes, plant upsets (eg microbiological changes) should be assessed.
- The sampling in the MBT Maturation Pad should clearly assess odours from the different types of products stored. This pad is used to store both FOGO and MWOO.
- The MBT Biofilter emissions are higher than the desirable odour emission target. This control is the primary mechanism for mitigating odour potential from the enclosed MBT facility. The operations and maintenance of the biofilters must be consistent with the Biofiltration Manual to ensure optimum performance.
- The potential for emissions from the sealed waste containers as they are opened in the mine void does not appear to have been considered (that is prior to the displacement of contents into the void – active tipping face).
- A FAOA survey was conducted as part of the audit. It does not appear to describe activities being conducted at the time of the surveys and demonstrate they were representative of operations. Eg opening of waste containers at mine void, landfilling operations, operation of MBT, composting operations, arrival of trains, gas extraction etc

Offensive odour at receptors

The Independent Odour Audit condition (f) requires the audit to:

> *(b) audit the effectiveness of the odour controls on site in regard to protecting receivers against offensive odour;*
>
> *(f) determine whether the project is complying with the requirements in this approval to protect receivers against offensive odour;*

The project approval states, "The Proponent shall not cause or permit the emission of offensive odours from the site, as defined under Section 129 of the POEO Act". Under this Act offensive odour means an odour—

> (*a) that, by reason of its strength, nature, duration, character or quality, or the time at which it is emitted, or any other circumstances—*
>
> > *(i) is harmful to (or is likely to be harmful to) a person who is outside the premises from which it is emitted, or*
> >
> > *(ii) interferes unreasonably with (or is likely to interfere unreasonably with) the comfort or repose of a person who is outside the premises from which it is emitted, or*
>
> *(b) that is of a strength, nature, duration, character or quality prescribed by the regulations or that is emitted at a time, or in other circumstances, prescribed by the regulations.*

The Audit should evaluate compliance and explicitly state whether the premises is complying with offensive odour.

The EPA makes the following observations:

- Odour complaints and odour surveys in IOU#9 indicate that offensive odours are occurring beyond the premise boundary and at receptors.
- The EPA does not consider modelling an appropriate means of assessing compliance with section 129 of the POEO Act for existing facilities. There is inherent uncertainty in using dispersion modelling to assess odour impact. Compliance with odour assessment criterion is one tool that provides an indication of acceptable odour impacts. The benchmark is if the emission of odour is offensive or is being prevented or minimised using best management practices and best available technology.
- The Independent Environmental Audit (IEA) Woodlawn Bioreactor and Crisp Creek Intermodal Facility (Ramboli, 25/05/21) does not appear to have identified a non-compliance with this offensive odour provision during the audit period (12 March 2018 to 17 March 2021). This was determined on the basis that no odour was detected by the Auditors during the site visit on 17 March 2021. The auditors did identify odour continues to be an issue for the community, odour complaints were received (Woodlawn Bioreactor Complaints Register), and Veolia have achieved a significant reduction in the number of odour complaints.
- Within the most recent Annual Return submitted to the EPA for the EPL No 11436, Veolia have reported a non-compliance with offensive odour provisions (defined under Section 129 of the POEO Act) for the licence reporting period between 4 September 2020 to 5 September 2021.
- IOU#9 refers to an "odour diary program" which appear to be collected annually and interpreted as part of the independent annual odour audit at the site (as described in Air Quality and Greenhouse Gas Management Plan (2018)). This annual time frame may not allow for timely adaptive management and continual improvement. It does not appear to mention any proactive actions by the Company to ascertain the performance of the facility, for example odour surveys in the community undertaken by the Company on a regular basis.

Review Complaint records

The Independent Odour Audit requires the audit to:

> *(c) review the Proponent's production data (that are relevant to the odour audit) and complaint records;*

The verification process for reports of odours currently appears limited and should be improved to better document and inform the source of the odours as well as the response/action taken to resolve the complaint.

The EPA make the following observations:

- The IEA (2021) makes several recommendations in relation to complaint analysis/verification procedures.
- The statements in Veolia's complaints register do not include sufficient details on investigation and findings. These include statements like:

  > *Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.*
  >
  > *A series of operational improvements have already been identified and are being progressively acted upon.*
  >
  > *Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting on Monday 10th May, 2021.*

- the content of the R4.2 reports provided by Veolia, as required by the EPL;
  - appear generic in nature and indicate the premises is operating normally
  - do not provide adequate information on odour investigation and findings and
  - do not clearly identify source and cause of the odour

The IOA#9 includes a graph (Figure 8.2) of the numbers of complaints received verses time of year (season). Some multivariant analysis of this data should be considered to explore the effects of different factors on complaints, for example:

- Gas extraction volumes/rates
- Barometric pressure ("barometric pumping")
- Rainfall
- Leachate volumes or height in landfill.
- geographical location of complainant

A similar approach could be used to interpret information from any regular odour surveys undertaken by the Company.

Review Air Quality and Greenhouse Gas Management Plan

The Independent Odour Audit requires the audit to:

> *7 (b) review the relevant odour sections of the Air Quality and Greenhouse Gas Management Plan for the project and assess the effectiveness of the odour controls;*

The Odour Audit #9 places a strong emphasis on the management and control of odours from the mine void. It states decreasing gas extraction volumes may be a contributing factor to the high number of odour complaints.

The EPA required increased (monthly) surface landfill gas monitoring program in a variation to the EPL in June 2021 for both methane and hydrogen sulfide. The intent of this monitoring is to help identify and control odours by detecting fugitive landfill gas emissions (including through the cover / capping material). This monitoring did not appear to be included in IOU#9.

Representative monitoring data will allow several aspects of surface landfill gas emissions to be regularly assessed and adaptively managed. This includes:

- the effect of changes in gas extraction volumes & the efficacy of landfill gas capture across the mine void (and in particular landfill margin).
- the effectiveness of cover and capping (eg biofiltration material) under a range of conditions and during periods of observed high volume gas release
- the effects of pressure changes within the vadose zone on migration of gas within the waste mass associated with changes in atmospheric barometric pressure (eg barometric pumping) and fluctuating leachate levels; and

- the early identification of increased gas concentrations that would allow for implementation of control measures such as increased gas extraction at problem sites.

The EPA makes the following observations on the current Air Quality and Green House Gas Management Plan (2018) on the company website regarding surface landfill gas monitoring requirements for hydrogen sulfide and methane:

- It does not appear to reflect the monthly monitoring in the current EPL.
- A monitoring methodology is not detailed (drawing on advice in the EPA Landfill Guidelines for methane and current best practice for hydrogen sulphide monitoring)
- It does not include a Trigger, Action, Response Plan (TARP) that utilises this monitoring information to adaptively manage any surface gas emissions and control odours.

Recommendations to improve odour control

The Independent Odour Audit requires the audit to:

> *(g) outline all reasonable and feasible measures (including a cost/benefit analysis, if required) that may be required to improve odour control at the site; and*
>
> *(h) recommend and prioritise (mandatory and non-mandatory) recommendations for their implementation.*

The 2021 Odour Audit includes recommendations, mandatory and non-mandatory, to improve odour control at the site. These recommendations are generally non-specific and are identical to the previous years' recommendations.

The Odour Audit must include clear and defined recommendations that are measurable, trackable and auditable. This will assist in determining if or how the recommendations from the Odour Audits will be implemented to achieve improved odour control and when they will be implemented.

The Audit should identify:

- Specific actions undertaken to improve odour control since the last odour audit and those that will be undertaken in the short-term, medium-term and long-term.
- Clearly distinguish between ongoing actions from previous odour audits and the additional recommended actions to be undertaken,
- For each recommendation/action state timeframes for commencement and completion,
- Evaluate all reasonable and feasible control options with best practice measures**.**

The EPA makes the following observations:

- Section 8 of the Odour Audit #9 includes recommendations from previous odour audits and the current response to those recommendations. Specifically;
    - Table 8.1 does not appear to provide any new information in the responses from the previous Odour Audit.
    - Table 8.2 is generally the same as the 2020 Odour Audit but includes a recommendation from the 2019 Odour Audit for the MBT facility and attributes the increase in odour complaints to the reduced landfill gas extraction.
- The Odour Audit indicates the landfill gas extraction efficiency as a source of very high odour potential.
- The Odour Audit outlines Veolia's ongoing operational processes and the Woodlawn Infrastructure Plan (WIP 2020) as the path to achieve improved gas extraction.
- The recommendations in Section 10 are general and a repetition of the recommendations from the previous Odour Audit with very few additional recommendations. There appears to be no clear indication of actions or progress made since the last Odour Audit.
- The Odour Audit has not provided any information on the expected odour outcomes that any of the measures are likely to achieve. This is due to most measures being the same as previously recommended. Therefore, it is unclear from previous Odour Audits whether all reasonable and feasible measures have been considered.

- The only significant change in the recommendations from the previous odour audit appears to be that the 'investigations of odour issues in the community' has been upgraded from a non-mandatory recommendation to a mandatory recommendation.
- Section 8.2.1.10.1 indicates that diverting diluted contaminated stormwater will present an opportunity to mitigate impacts associated with high rainfall events on landfill capture gas if suitable monitoring and performance metrics can be established. The discussion on the management of high rainfall events however remains generally the same as previous years despite the extreme rainfall events and ongoing odour complaints during the odour audit period.
- The IEA (2021) makes several recommendations in relation to previous Odour audits. This includes avoiding generic recommendations.

IOU#9 appears to place a strong emphasis on continual improvement in landfill gas collection efficiency. It also relies on the proving of the LTP. There may be limitations in these approaches to fully address odours given various design, installation, operational and maintenance constraints.

A feature of community complaints has been alleged offensive odours related to hydrogen sulfide ("rotten egg") odours. Various techniques for hydrogen sulfide control from landfills are known in the scientific literature and could be investigated. These include, but are not limited to:

- Reducing sulfur sources in the landfill available to generate hydrogen sulfide,
- Use of chemical inhibitors (or pH control) for sulfur reducing bacteria present in the landfill that may generate hydrogen sulfide.
- Landfill covers (cover soil amendments) to reduce hydrogen sulfide through precipitation, adsorption or oxidation. Eg amended (lime) earth, metal oxides or other biocovers.
- Leachate Management – Eg Treatment to remove or reduce sulfur.
- Capping systems as part of final or intermediate cover to provide a barrier to fugitive hydrogen sulfide production and emissions.
- Passive techniques such as vegetative windbreaks to help dilution and dispersion of gas concentrations of odour from the mine void by creating a mixing effect, especially during times of poor atmospheric dispersion.
- Use of real-time monitors (mine void and/or off-site) to respond promptly to odours, modify activities and inform day to day management decisions (eg TARPs).

Reviewing and Reporting

The EPA understands that the audit deliverables are to include a comprehensive review of all new and relevant assessment reports/documentation since the last odour audit. The following are considered relevant for review:

- Woodlawn Eco-precinct Independent Odour Audit (IOA) 2021 Recommended Responses, Veolia Environmental Services, 2021
- Leachate Assessment at Woodlawn Bioreactor, Earth2Water, 3 August 2021
- Project Report – Investigation and Assessment of H2S Gas emissions at the Woodlawn Bioreactor, Epic Environmental, 3 December 2021

APPENDIX B:

ODOUR CONCENTRATION LABORATORY TESTING RESULT SHEETS

THE ODOUR UNIT PTY LTD

THE ODOUR UNIT

Level 3 Suite 12
56 Church Avenue
MASCOT NSW 2020

Phone: +61 2 9209 4420
Email: info@odourunit.com.au
Internet: www.odourunit.com.au
ABN: 53 091 163 061

NATA
Accreditation Number: 14974

Odour Concentration Measurement Report

The measurement was commissioned by:

Organisation	Veolia Environmental Services	Telephone	+61 2 8588 1362
Contact	M. Rakete	Facsimile	--
Sampling Site	Woodlawn, NSW	Email	woodlawn@veolia.com
Sampling Method	Woodlawn, NSW	Sampling Team	TOU (TS, MA, AS, JS, IF, SH & MG)

Order details:

Order requested by	M. Rakete	Order accepted by	M. Assal
Date of order	February 2022	TOU Project #	N1806L.10
Order number	Refer to correspondence	Project Manager	M. Assal
Signed by	Refer to correspondence	Panel Operator	J. 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/NZS4323.3). 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.

Instrumental Precision
The precision of this instrument (expressed as repeatability) for a sensory calibration must be $r \leq 0.477$ in accordance with the AS/NZS 4323.3.
$r = 0.280$ Compliance – Yes

Instrumental Accuracy
The accuracy of this instrument for a sensory calibration must be $A \leq 0.217$ in accordance with the AS/NZS 4323.3.
$A = 0.076$ 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: Monday, 4 April 2022

Panel Roster Number: SYD20220322_020

A. Schulz
Authorised Signatory

THE ODOUR UNIT PTY LTD

Accreditation Number: 14974

Odour Sample Measurement Results
Panel Roster Number: SYD20220322_020

Sample Location	TOU Sample ID	Sampling Date & Time	Analysis Date & Time	Panel Size	Valid ITEs	Sample Odour Concentration (Final, allowing for dilution) (ou)
Sample 7 - ED3N4	SC22167	21/03/2022 1500 hrs	22/03/2022 1018 hrs	4	8	83
Sample 10 - ED1 Coffer	SC22168	21/03/2022 1628 hrs	22/03/2022 1101 hrs	4	8	45
Sample 8 - ED3N4	SC22169	21/03/2022 1552 hrs	22/03/2022 1137 hrs	4	8	83
Sample 6 - ED3N3 (SE Corner)	SC22170	21/03/2022 1538 hrs	22/03/2022 1207 hrs	4	8	83
Sample 11 - ED1 Coffer (3 of 3)	SC22171	21/03/2022 1756 hrs	22/03/2022 1756 hrs	4	8	49
Sample 5 - ED3N3 (NE Corner)	SC22172	21/03/2022 1538 hrs	22/03/2022 1341 hrs	4	8	45
Sample 9- ED1 Coffer	SC22173	21/03/2022 1612 hrs	22/03/2022 1411 hrs	4	8	99

Samples Received in Laboratory – From: J. Schulz Date: 21/03/2022 Time: 2000 hrs

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

1. The collection of samples by the methods of AS/NZS 4323.4 and the calculation of Specific Odour Emission Rate (SOER).
2. Final results that have been modified by the dilution factors where parties other than The Odour Unit Pty Ltd have performed the dilution of samples.

THE ODOUR UNIT PTY LTD

Accreditation Number: 14974

Odour Sample Measurement Results
Panel Roster Number: SYD20220322_020

Sample Location	TOU Sample ID	Sampling Date & Time	Analysis Date & Time	Panel Size	Valid ITEs	Sample Odour Concentration (Final, allowing for dilution) (ou)
Sample 12 - Leachate Dam (Anoxic)	SC22174	21/03/2022 1440 hrs	22/03/2022 1439 hrs	4	8	861
Sample 13 - Leachate Dam (Aerobic)	SC22175	21/03/2022 1440 hrs	22/03/2022 1506 hrs	4	8	609
Sample 4 - ED3N2 (SE Corner)	SC22176	21/03/2022 1435 hrs	22/03/2022 1534 hrs	4	8	1,220
Sample 3 - ED3N2 (E Corner)	SC22177	21/03/2022 1453 hrs	22/03/2022 1605 hrs	4	8	5,310
Sample 2 - ED3N1 (NW Shoreline)	SC22178	21/03/2022 1454 hrs	22/03/2022 1633 hrs	4	8	2,900
Sample 1 - ED3N1	SC22179	21/03/2022 1448 hrs	22/03/2022 1656 hrs	4	8	6,880

Samples Received in Laboratory – From: J. Schulz Date: 21/03/2022 Time: 2000 hrs

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

1. The collection of samples by the methods of AS/NZS 4323.4 and the calculation of Specific Odour Emission Rate (SOER).
2. Final results that have been modified by the dilution factors where parties other than The Odour Unit Pty Ltd have performed the dilution of samples.

THE ODOUR UNIT PTY LTD

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	SYD20220322_020	51,000	$20 \leq \chi \leq 80$	724	70	Yes

Comments

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

Sample I.D.	Odour Character	Sample I.D.	Odour Character
SC22167	sour, garbage	SC22174	rotten egg, faecal
SC22168	garbage	SC22175	rotten egg, faecal
SC22169	garbage, pungent, sweet	SC22176	rotten egg
SC22170	dirty, muddy	SC22177	rotten egg, faecal
SC22171	musty, stagnant, dirty	SC22178	rotten egg, faecal
SC22172	dirty, muddy	SC22179	rotten egg, faecal
SC22173	dirty, muddy		

Disclaimers

1. Parties, other than The Odour Unit Pty Ltd, responsible for collecting odour samples have advised that they have voluntarily furnished these odour samples, appropriately collected and labelled, to The Odour Unit Pty Ltd for the purpose of odour testing.
2. The collection of odour samples by parties other than The Odour Unit Pty Ltd relinquishes The Odour Unit Pty Ltd 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 Pty Ltd.
4. This report shall not be reproduced, except in full, without written approval of The Odour Unit Pty Ltd.

Report Status

Status	Version	Date	Prepared by	Checked by	Change	Reason
Draft	0.1	04/04/2022	M. Gilbert	I. Farrugia	-	-
Final	1.0	06/04/2022	-	M. Assal	-	-
Revised	-	-	-	-	-	-

END OF DOCUMENT

THE ODOUR UNIT PTY LTD

THE ODOUR UNIT

Level 3 Suite 12
56 Church Avenue
MASCOT NSW 2020

Phone: +61 2 9209 4420
Email: info@odourunit.com.au
Internet: www.odourunit.com.au
ABN: 53 091 163 061

NATA
Accreditation Number: 14974

Odour Concentration Measurement Report

The measurement was commissioned by:

Organisation	Veolia Environmental Services	Telephone	+61 2 8588 1362
Contact	M. Rakete	Facsimile	--
Sampling Site	Woodlawn, NSW	Email	woodlawn@veolia.com
Sampling Method	Woodlawn, NSW	Sampling Team	TOU (TS, MA, AS, JS, IF, SH & MG)

Order details:

Order requested by	M. Rakete	Order accepted by	M. Assal
Date of order	February 2022	TOU Project #	N1806L.10
Order number	Refer to correspondence	Project Manager	M. Assal
Signed by	Refer to correspondence	Panel Operator	J. 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/NZS4323.3). 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.
Instrumental Precision	The precision of this instrument (expressed as repeatability) for a sensory calibration must be $r \leq 0.477$ in accordance with the AS/NZS 4323.3. $r = 0.280$ Compliance – Yes
Instrumental Accuracy	The accuracy of this instrument for a sensory calibration must be $A \leq 0.217$ in accordance with the AS/NZS 4323.3. $A = 0.076$ 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: Monday, 4 April 2022

Panel Roster Number: SYD20220323_021

A. Schulz
Authorised Signatory

THE ODOUR UNIT PTY LTD

Accreditation Number: 14974

Odour Sample Measurement Results
Panel Roster Number: SYD20220323_021

Sample Location	TOU Sample ID	Sampling Date & Time	Analysis Date & Time	Panel Size	Valid ITEs	Sample Odour Concentration (Final, allowing for dilution) (ou)
Sample 14 - ED3S2 (East)	SC22180	22/03/2022 1115 hrs	23/03/2022 1000 hrs	4	8	108
Sample 15 - ED3S2 (West)	SC22181	22/03/2022 1157 hrs	23/03/2022 1032 hrs	4	8	91
Sample 16 - WCA near M09	SC22182	22/03/2022 1130 hrs	23/03/2022 1105 hrs	4	8	49
Sample 17 - WCA near J04	SC22183	22/03/2022 1132 hrs	23/03/2022 1138 hrs	4	8	41
Sample 18 - WCA near J13	SC22184	22/03/2022 1129 hrs	23/03/2022 1204 hrs	4	8	49
Sample 19 - WCA near M12	SC22185	22/03/2022 1130 hrs	23/03/2022 1256 hrs	4	8	45
Sample 20 - WCA near J18	SC22186	22/03/2022 1144 hrs	23/03/2022 1325 hrs	4	8	128

Samples Received in Laboratory – From: T. Schulz Date: 22/03/2022 Time: 2000 hrs

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

1. The collection of samples by the methods of AS/NZS 4323.4 and the calculation of Specific Odour Emission Rate (SOER).
2. Final results that have been modified by the dilution factors where parties other than The Odour Unit Pty Ltd have performed the dilution of samples.

THE ODOUR UNIT PTY LTD

Accreditation Number: 14974

Odour Sample Measurement Results
Panel Roster Number: SYD20220323_021

Sample Location	TOU Sample ID	Sampling Date & Time	Analysis Date & Time	Panel Size	Valid ITEs	Sample Odour Concentration (Final, allowing for dilution) (ou)
Sample 21 - WCA near H18	SC22187	22/03/2022 1237 hrs	23/03/2022 1344 hrs	4	8	128
Sample 22 - WCA near F10	SC22188	22/03/2022 1245 hrs	23/03/2022 1408 hrs	4	4*	64
Sample 23 - WCA near F12	SC22189	22/03/2022 1258 hrs	23/03/2022 1438 hrs	4	8	64
Sample 24 – WCA near J07 – J08	SC22190	22/03/2022 1344 hrs	23/03/2022 1511 hrs	4	8	49
Sample 25 – WCA near K07 – K08	SC22191	22/03/2022 1347 hrs	23/03/2022 1535 hrs	4	8	76
Sample 26 - Biocover (NE Corner)	SC22192	22/03/2022 1412 hrs	23/03/2022 1600 hrs	4	8	54

Samples Received in Laboratory – From: T. Schulz Date: 22/03/2022 Time: 2000 hrs

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

1. The collection of samples by the methods of AS/NZS 4323.4 and the calculation of Specific Odour Emission Rate (SOER).
2. Final results that have been modified by the dilution factors where parties other than The Odour Unit Pty Ltd have performed the dilution of samples.

* Insufficient sample to complete second round of testing

THE ODOUR UNIT PTY LTD

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	SYD20220322_021	51,000	$20 \leq \chi \leq 80$	1024	50	Yes

Comments

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

Sample I.D.	Odour Character	Sample I.D.	Odour Character
SC22180	rotten egg, pungent	SC22187	sweet ester, garbage
SC22181	musty, dirty	SC22188	sweet ester, garbage
SC22182	musty, dirty	SC22189	sweet ester, garbage
SC22183	musty, dirty	SC22190	sweet ester, garbage
SC22184	musty, dirty	SC22191	sweet ester, garbage
SC22185	musty, dirty	SC22192	sweet ester, garbage
SC22186	sweet ester, garbage		

Disclaimers

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Final	1.0	06/04/2022	-	M. Assal	-	-
Revised	-	-	-	-	-	-

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Internet: www.odourunit.com.au
ABN: 53 091 163 061

NATA
Accreditation Number: 14974

Odour Concentration Measurement Report

The measurement was commissioned by:

Organisation	Veolia Environmental Services	Telephone	+61 2 8588 1362
Contact	M. Rakete	Facsimile	--
Sampling Site	Woodlawn, NSW	Email	woodlawn@veolia.com
Sampling Method	Woodlawn, NSW	Sampling Team	TOU (TS, MA, AS, JS, IF, SH & MG)

Order details:

Order requested by	M. Rakete	Order accepted by	M. Assal
Date of order	February 2022	TOU Project #	N1806L.10
Order number	Refer to correspondence	Project Manager	M. Assal
Signed by	Refer to correspondence	Panel Operator	J. 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/NZS4323.3). 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.

Instrumental Precision
The precision of this instrument (expressed as repeatability) for a sensory calibration must be $r \leq 0.477$ in accordance with the AS/NZS 4323.3.
$r = 0.280$ Compliance – Yes

Instrumental Accuracy
The accuracy of this instrument for a sensory calibration must be $A \leq 0.217$ in accordance with the AS/NZS 4323.3.
$A = 0.076$ 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: Monday, 4 April 2022

Panel Roster Number: SYD20220324_022

A. Schulz
Authorised Signatory

THE ODOUR UNIT PTY LTD

Accreditation Number: 14974

Odour Sample Measurement Results
Panel Roster Number: SYD20220324_022

Sample Location	TOU Sample ID	Sampling Date & Time	Analysis Date & Time	Panel Size	Valid ITEs	Sample Odour Concentration (ou)
Sample 31 - Biofilter 1, Cell 1	SC22193	23/03/2022 1226 hrs	24/03/2022 1012 hrs	4	8	2,440
Sample 32 - Biofilter 1, Cell 2	SC22194	23/03/2022 1240 hrs	24/03/2022 1043 hrs	4	8	2,050
Sample 33 - Biofilter 1, Cell 3	SC22195	23/03/2022 1256 hrs	24/03/2022 1110 hrs	4	8	2,050
Sample 35 - Biofilter 2, Cell 1	SC22196	23/03/2022 1240 hrs	24/03/2022 1142 hrs	4	8	235
Sample 36 - Biofilter 2, Cell 3	SC22197	23/03/2022 1252 hrs	24/03/2022 1210 hrs	4	8	108
Sample 37 - Biofilter 2, Cell 4	SC22198	23/03/2022 1303 hrs	24/03/2022 1313 hrs	4	8	215
Sample 38 - Biofilter 2, Cell 2	SC22199	23/03/2022 1316 hrs	24/03/2022 1342 hrs	4	8	166

Samples Received in Laboratory – From: A. Schulz Date: 23/03/2022 Time: 2000 hrs

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

1. The collection of samples by the methods of AS/NZS 4323.4 and the calculation of Specific Odour Emission Rate (SOER).
2. Final results that have been modified by the dilution factors where parties other than The Odour Unit Pty Ltd have performed the dilution of samples.

THE ODOUR UNIT PTY LTD

Accreditation Number: 14974

Sample Measurement Results
Panel Roster Number: SYD20220324_022

Sample Location	TOU Sample ID	Sampling Date & Time	Analysis Date & Time	Panel Size	Valid ITEs	Sample Odour Concentration (ou)
Sample 39 - Biofilter 2, Common Inlet	SC22200	23/03/2022 1323 hrs	24/03/2022 1421 hrs	4	8	790
Sample 34 - Biofilter 1, Common Inlet	SC22201	23/03/2022 1305 hrs	24/03/2022 1451 hrs	4	8	4,470
Sample 27 - LAP (West)	SC22202	23/03/2022 1241 hrs	24/03/2022 1523 hrs	4	8	16,400
Sample 28 - LAP (East)	SC22203	23/03/2022 1327 hrs	24/03/2022 1554 hrs	4	8	6,890
Sample 29 - MBT Evaporation Dam (West)	SC22204	23/03/2022 1240 hrs	24/03/2022 1621 hrs	4	8	6,890
Sample 30 – MBT Evaporation Dam (East)	SC22205	23/03/2022 1324 hrs	24/03/2022 1646 hrs	4	8	8,930

Samples Received in Laboratory – From: A. Schulz Date: 23/03/2022 Time: 2000 hrs

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

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THE ODOUR UNIT PTY LTD

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	SYD20220324_022	51,000	$20 \leq \chi \leq 80$	724	70	Yes

Comments

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

Sample I.D.	Odour Character	Sample I.D.	Odour Character
SC22193	earthy, soil, garbage	SC22200	garbage, compost
SC22194	earthy, soil, garbage	SC22201	garbage
SC22195	earthy, soil, garbage	SC22202	rendering, ammonia, pungent
SC22196	earthy, soil	SC22203	rendering, ammonia, pungent
SC22197	earthy, soil	SC22204	rendering, ammonia, pungent
SC22198	earthy, soil	SC22205	rendering, ammonia, pungent
SC22199	earthy, soil		

Disclaimers

1. Parties, other than The Odour Unit Pty Ltd, responsible for collecting odour samples have advised that they have voluntarily furnished these odour samples, appropriately collected and labelled, to The Odour Unit Pty Ltd for the purpose of odour testing.
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Report Status

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Draft	0.1	04/04/2022	M. Gilbert	I. Farrugia	-	-
Final	1.0	05/04/2022	-	M. Assal	-	-
Revised	-	-	-	-	-	-

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Email: info@odourunit.com.au
Internet: www.odourunit.com.au
ABN: 53 091 163 061

NATA
Accreditation Number: 14974

Odour Concentration Measurement Report

The measurement was commissioned by:

Organisation	Veolia Environmental Services	Telephone	+61 2 8588 1362
Contact	M. Rakete	Facsimile	--
Sampling Site	Woodlawn, NSW	Email	woodlawn@veolia.com
Sampling Method	Woodlawn, NSW	Sampling Team	TOU (TS, MA, AS, JS, IF, SH & MG)

Order details:

Order requested by	M. Rakete	Order accepted by	M. Assal
Date of order	February 2022	TOU Project #	N1806L.10
Order number	Refer to correspondence	Project Manager	M. Assal
Signed by	Refer to correspondence	Panel Operator	J. 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/NZS4323.3). 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.

Instrumental Precision
The precision of this instrument (expressed as repeatability) for a sensory calibration must be $r \leq 0.477$ in accordance with the AS/NZS 4323.3.
$r = 0.280$ Compliance – Yes

Instrumental Accuracy
The accuracy of this instrument for a sensory calibration must be $A \leq 0.217$ in accordance with the AS/NZS 4323.3.
$A = 0.076$ 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.

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This report shall not be reproduced, except in full.

Date: Monday, 4 April 2022

Panel Roster Number: SYD20220325_023

A. Schulz
Authorised Signatory

THE ODOUR UNIT PTY LTD

Accreditation Number: 14974

Odour Sample Measurement Results
Panel Roster Number: SYD20220325_023

Sample Location	TOU Sample ID	Sampling Date & Time	Analysis Date & Time	Panel Size	Valid ITEs	Sample Odour Concentration (ou)
Sample 40 - ATF, < 1 day old	SC22206	24/03/2022 1025 hrs	25/03/2022 1005 hrs	4	8	5,790
Sample 41 - ATF, 1 month old	SC22207	24/03/2022 1025 hrs	25/03/2022 1036 hrs	4	8	4,870
Sample 42 - ATF, exposed waste surface	SC22208	24/03/2022 1025 hrs	25/03/2022 1129 hrs	4	8	512
Sample 43 - Area 1, Location 3, Maturation Pad	SC22209	24/03/2022 1333 hrs	25/03/2022 1201 hrs	4	8	332
Sample 44 - Area 1, Location 6, Maturation Pad	SC22210	24/03/2022 1334 hrs	25/03/2022 1302 hrs	4	8	664
Sample 45 - Area 2, Location 3, Maturation Pad	SC22211	24/03/2022 1331 hrs	25/03/2022 1331 hrs	4	8	332
Sample 46 - Area 2, Location 6, Maturation Pad	SC22212	24/03/2022 1333 hrs	25/03/2022 1401	4	8	181

Samples Received in Laboratory – From: I. Farrugia Date: 24/03/2022 Time: 2000 hrs

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

1. The collection of samples by the methods of AS/NZS 4323.4 and the calculation of Specific Odour Emission Rate (SOER).
2. Final results that have been modified by the dilution factors where parties other than The Odour Unit Pty Ltd have performed the dilution of samples.

THE ODOUR UNIT PTY LTD

Accreditation Number: 14974

Odour Sample Measurement Results
Panel Roster Number: SYD20220325_023

Sample Location	TOU Sample ID	Sampling Date & Time	Analysis Date & Time	Panel Size	Valid ITEs	Sample Odour Concentration (ou)
Sample 47 - Area 10, Location 10, Maturation Pad	SC22213	24/03/2022 1349 hrs	25/03/2022 1426 hrs	4	8	304
Sample 48 - Area 3, Location 1, Maturation Pad	SC22214	24/03/2022 1339 hrs	25/03/2022 1452 hrs	4	8	279
Sample 49 - Area 3, Location 3, Maturation Pad	SC22215	24/03/2022 1330 hrs	25/03/2022 1518 hrs	4	8	558
Sample 50 - Area 3, Location 4, Maturation Pad	SC22216	24/03/2022 1330 hrs	25/03/2022 1545 hrs	4	8	13,800
Sample 51 - FOGO Stockpile, >4 weeks old, Shredded	SC22217	24/03/2022 1451 hrs	25/03/2022 1648 hrs	4	8	128
Sample 52 - FOGO Stockpile, 2 weeks old, shredded	SC22218	24/03/2022 1453 hrs	25/03/2022 1714 hrs	4	8	181

Samples Received in Laboratory – From: I. Farrugia Date: 24/03/2022 Time: 2000 hrs

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THE ODOUR UNIT PTY LTD

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	SYD20220325_023	51,000	$20 \leq \chi \leq 80$	861	59	Yes

Comments

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

Sample I.D.	Odour Character	Sample I.D.	Odour Character
SC22206	garbage, compost, fermented	SC22213	compost, nutty
SC22207	garbage, compost, fermented	SC22214	compost, nutty
SC22208	garbage	SC22215	compost, nutty, garbage
SC22209	compost, nutty	SC22216	compost, nutty, garbage
SC22210	compost, nutty	SC22217	garbage, compost
SC22211	compost, nutty	SC22218	garbage, compost
SC22212	compost, nutty		

Disclaimers

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ABN: 53 091 163 061

NATA
Accreditation Number: 14974

Odour Concentration Measurement Report

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Organisation	Veolia Environmental Services	Telephone	+61 2 8588 1362
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Signed by	Refer to correspondence	Panel Operator	J. Schulz

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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/NZS4323.3). 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.

Instrumental Precision
The precision of this instrument (expressed as repeatability) for a sensory calibration must be $r \leq 0.477$ in accordance with the AS/NZS 4323.3.
$r = 0.280$ Compliance – Yes

Instrumental Accuracy
The accuracy of this instrument for a sensory calibration must be $A \leq 0.217$ in accordance with the AS/NZS 4323.3.
$A = 0.076$ 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: Monday, 4 April 2022

Panel Roster Number: SYD20220330_024

A. Schulz
Authorised Signatory

THE ODOUR UNIT PTY LTD

Accreditation Number: 14974

Odour Sample Measurement Results
Panel Roster Number: SYD20220330_024

Sample Location	TOU Sample ID	Sampling Date & Time	Analysis Date & Time	Panel Size	Valid ITEs	Sample Odour Concentration (ou)
Sample 9 - LOM	SC22219	30/03/2022 0847 hrs	30/03/2022 1012 hrs	4	8	29
Sample 10 - LOM	SC22220	30/03/2022 0900 hrs	30/03/2022 1042 hrs	4	8	<16
Sample 11 - LOM	SC22221	30/03/2022 0907 hrs	30/03/2022 1112 hrs	4	8	<16
Sample 14 - LOM	SC22222	30/03/2022 0909 hrs	30/03/2022 1142 hrs	4	8	118
Sample 14A - LOM	SC22223	30/03/2022 0916 hrs	30/03/2022 1210 hrs	4	8	108
Sample 15 - LOM	SC22224	30/03/2022 0925 hrs	30/03/2022 1320 hrs	4	8	118
Sample 7 - LOM	SC22225	30/03/2022 1045 hrs	30/03/2022 1401	4	8	59

Liquid Samples Received in Laboratory – From: M. Assal Date: 25/03/2022 Time: 0830 hrs

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

1. The collection of samples by the methods of AS/NZS 4323.4 and the calculation of Specific Odour Emission Rate (SOER).
2. Final results that have been modified by the dilution factors where parties other than The Odour Unit Pty Ltd have performed the dilution of samples.

***** Insufficient sample for second round of testing

THE ODOUR UNIT PTY LTD

Accreditation Number: 14974

Odour Sample Measurement Results
Panel Roster Number: SYD20220330_024

Sample Location	TOU Sample ID	Sampling Date & Time	Analysis Date & Time	Panel Size	Valid ITEs	Sample Odour Concentration (ou)
Sample 8 - LOM	SC22226	30/03/2022 1052 hrs	30/03/2022 1437 hrs	4	4*	<16
Sample 8A - LOM	SC22227	30/03/2022 1100 hrs	30/03/2022 1504 hrs	4	8	19
Sample 6A - LOM	SC22228	30/03/2022 1127 hrs	30/03/2022 1528 hrs	4	8	19
Sample 5 - LOM	SC22229	30/03/2022 1112 hrs	30/03/2022 1553 hrs	4	8	<16
Sample 6 - LOM	SC22230	30/03/2022 1117 hrs	30/03/2022 1614 hrs	4	8	23

Liquid Samples Received in Laboratory – From: M. Assal Date: 25/03/2022 Time: 0830 hrs

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

3. The collection of samples by the methods of AS/NZS 4323.4 and the calculation of Specific Odour Emission Rate (SOER).
4. Final results that have been modified by the dilution factors where parties other than The Odour Unit Pty Ltd have performed the dilution of samples.

***** Insufficient sample for second round of testing

THE ODOUR UNIT PTY LTD

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	SYD20220330_024	51,000	$20 \leq \chi \leq 80$	724	70	Yes

Comments

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

Sample I.D.	Odour Character	Sample I.D.	Odour Character
SC22219	musty	SC22225	ammoniacal, sour
SC22220	musty	SC22226	musty
SC22221	musty	SC22227	musty
SC22222	ammoniacal, sour	SC22228	musty
SC22223	ammoniacal, sour	SC22229	musty
SC22224	ammoniacal, sour	SC22230	musty

Disclaimers

1. Parties, other than The Odour Unit Pty Ltd, responsible for collecting odour samples have advised that they have voluntarily furnished these odour samples, appropriately collected and labelled, to The Odour Unit Pty Ltd for the purpose of odour testing.
2. The collection of odour samples by parties other than The Odour Unit Pty Ltd relinquishes The Odour Unit Pty Ltd 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 Pty Ltd.
4. This report shall not be reproduced, except in full, without written approval of The Odour Unit Pty Ltd.

Report Status

Status	Version	Date	Prepared by	Checked by	Change	Reason
Draft	0.1	05/04/2022	M. Gilbert	I. Farrugia	-	-
Final	1.0	05/04/2022	-	M. Assal	-	-
Revised	-	-	-	-	-	-

END OF DOCUMENT

THE ODOUR UNIT PTY LTD

THE ODOUR UNIT

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Internet: www.odourunit.com.au
ABN: 53 091 163 061

NATA
Accreditation Number: 14974

Odour Concentration Measurement Report

The measurement was commissioned by:

Organisation	Veolia Environmental Services	Telephone	+61 2 8588 1362
Contact	M. Rakete	Facsimile	--
Sampling Site	Woodlawn, NSW	Email	woodlawn@veolia.com
Sampling Method	Woodlawn, NSW	Sampling Team	TOU (TS, MA, AS, JS, IF, SH & MG)

Order details:

Order requested by	M. Rakete	Order accepted by	M. Assal
Date of order	February 2022	TOU Project #	N1806L.10
Order number	Refer to correspondence	Project Manager	M. Assal
Signed by	Refer to correspondence	Panel Operator	J. 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/NZS4323.3). 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.

Instrumental Precision
The precision of this instrument (expressed as repeatability) for a sensory calibration must be $r \leq 0.477$ in accordance with the AS/NZS 4323.3.
$r = 0.280$ Compliance – Yes

Instrumental Accuracy
The accuracy of this instrument for a sensory calibration must be $A \leq 0.217$ in accordance with the AS/NZS 4323.3.
$A = 0.076$ 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, 5 April 2022

Panel Roster Number: SYD20220401_026

A. Schulz
Authorised Signatory

THE ODOUR UNIT PTY LTD

Accreditation Number: 14974

Odour Sample Measurement Results
Panel Roster Number: SYD20220401_026

Sample Location	TOU Sample ID	Sampling Date & Time	Analysis Date & Time	Panel Size	Valid ITEs	Sample Odour Concentration (ou)
Sample 3 - LOM	SC22237	01/04/2022 0832 hrs	01/04/2022 1030 hrs	4	8	128
Sample 3A - LOM	SC22238	01/04/2022 0838 hrs	01/04/2022 1057 hrs	4	8	118
Sample 4 - LOM	SC22239	01/04/2022 0849 hrs	01/04/2022 1126 hrs	4	8	108
Sample 1 - LOM	SC22240	01/04/2022 0900 hrs	01/04/2022 1151 hrs	4	8	140
Sample 2 - LOM	SC22241	01/04/2022 0904 hrs	01/04/2022 1304 hrs	4	8	108
Sample 2A - LOM	SC22242	01/04/2022 0913 hrs	01/04/2022 1329 hrs	4	8	128

Liquid Samples Received in Laboratory – From: M. Assal Date: 25/03/2022 Time: 0830 hrs

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

1. The collection of samples by the methods of AS/NZS 4323.4 and the calculation of Specific Odour Emission Rate (SOER).
2. Final results that have been modified by the dilution factors where parties other than The Odour Unit Pty Ltd have performed the dilution of samples.

THE ODOUR UNIT PTY LTD

Accreditation Number: 14974

Odour Sample Measurement Results
Panel Roster Number: SYD20220401_026

Sample Location	TOU Sample ID	Sampling Date & Time	Analysis Date & Time	Panel Size	Valid ITEs	Sample Odour Concentration (ou)
MBT LOM - Evaporation Pond (Furthest)	SC22243	01/04/2022 0925 hrs	01/04/2022 1402 hrs	4	8	256
MBT LOM - Evaporation Pond (Nearest to Inlet)	SC22244	01/04/2022 0934 hrs	01/04/2022 1428 hrs	4	8	332
LAP – 1 - MBT (Closet to Inlet)	SC22245	01/04/2022 0942 hrs	01/04/2022 1455 hrs	4	8	332
LAP – 2 – MBT (Furthest from inlet)	SC22246	1/04/2022 0953 hrs	1/04/2022 1520 hrs	4	8	235

Liquid Samples Received in Laboratory – From: M. Assal Date: 25/03/2022 Time: 0830 hrs

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

1. The collection of samples by the methods of AS/NZS 4323.4 and the calculation of Specific Odour Emission Rate (SOER).
2. Final results that have been modified by the dilution factors where parties other than The Odour Unit Pty Ltd have performed the dilution of samples.

THE ODOUR UNIT PTY LTD

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	SYD20220401_026	51,000	$20 \leq \chi \leq 80$	1024	50	Yes

Comments

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

Sample I.D.	Odour Character	Sample I.D.	Odour Character
SC22237	pungent, rendering, ammonia	SC22242	ammoniacal
SC22238	pungent, rendering, ammonia	SC22243	ammoniacal, fertiliser, pungent, vomit
SC22239	ammoniacal, pungent	SC22244	ammoniacal, fertiliser, pungent, vomit
SC22240	ammoniacal, pungent	SC22245	ammoniacal, fertiliser, pungent, vomit
SC22241	ammoniacal	SC22246	ammoniacal, fertiliser, pungent, vomit

Disclaimers

1. Parties, other than The Odour Unit Pty Ltd, responsible for collecting odour samples have advised that they have voluntarily furnished these odour samples, appropriately collected and labelled, to The Odour Unit Pty Ltd for the purpose of odour testing.
2. The collection of odour samples by parties other than The Odour Unit Pty Ltd relinquishes The Odour Unit Pty Ltd 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 Pty Ltd.
4. This report shall not be reproduced, except in full, without written approval of The Odour Unit Pty Ltd.

Report Status

Status	Version	Date	Prepared by	Checked by	Change	Reason
Draft	0.1	05/04/2022	M. Gilbert	I. Farrugia	-	-
Final	1.0	05/04/2022	-	M. Assal	-	-
Revised	-	-	-	-	-	-

END OF DOCUMENT

APPENDIX C:

TECHNICAL DOCUMENTATION RELEVANT TO THE AUDIT

ODOUR COMPLAINTS REGISTER:

1 APRIL 2021 AND 5 APRIL 2022

Woodlawn Bioreactor Complaints Register

Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
18/03/2022	3:00:00 pm	11455	EPA Environmental Line		Road Traffic	Letter	Bungendore Road, Tarago	A community member observed an alleged leaking shipping container aboard a truck in transit from the Crisps Creek Intermodal Facility to the Woodlawn Landfill along Bungadore Rd on the 18th March 2022.	Not Applicable	As the waste had been containerised and stored in Sydney for a period of time, Veolia had already implemented measures to reduce the impact on the community and environment.
05/04/2022	5:45:00 am	20476	EPA Environmental Line	7168	Odour	Letter	Willow Glen Road, Lower Boro	The EPA received a report to Environment Line from a resident of Willow Glen Road, Lower Boro who was affected by offensive odour at their property allegedly coming from EPL20476 at Collector. The caller described the odour as a rotten smell in the air that started dissipating at 9am.	Not Specified	An assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour was undertaken. Veolia continues to refine its investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.
05/04/2022	9:30:00 am	20476	EPA Environmental Line	7179	Odour	Letter	Leahys Lane, Tarago	The EPA received a report to Environment Line from a resident of Leahys Lane, Tarago who was affected by an offensive odour at their property. They advised that at the time of the incident, there was no wind and rated the odour strength a 5 out of 6. The odour was described by the reporter as the usual odour; a rotten, awful smell.	Not Specified	An assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour was undertaken. Veolia continues to refine its investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.
04/04/2022	1:00:00 am	20476	EPA Environmental Line	7179	Odour	Letter	Willow Glen Road, Lower Boro	The EPA received a report to Environment Line from a resident of Willow Glen Road, Lower Boro who was affected by an offensive odour at their property which was still there when the reporter left their property at 9:15am. The reporter advised that the wind was westerly at the time of the incident.	Approx 8 ¼ hours	An assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour was undertaken. Veolia continues to refine its investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.
29/03/2022	7:23:00 pm	Unknown	EPA Environmental Line	7162	Odour	Letter	Unknown Location	The EPA received a report to Environment Line from a resident of unknown address who was affected by offensive odour at their property. The report stated that an odour is coming from the pit, not as offensive as what it has been but it still stinks.	Not Specified	An assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour was undertaken. Veolia continues to refine its investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.
31/03/2022	Not Specified	20476	EPA Environmental Line	7117	Odour	Letter	Carneys Road, Currawang	The EPA received a report to Environment Line from a resident residing in Carneys Rd, Currawang. The complainant reported being impacted by an "overwhelmingly disgusting odour" that was first observed yesterday morning and persisted throughout the day.	Not Specified	An assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour was undertaken. Veolia continues to refine its investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.

Woodlawn Bioreactor Complaints Register

Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
31/03/2022	3:00:00 pm	20476	EPA Environmental Line	7142	Odour	Letter	Currawang	The EPA received a report to Environment Line from a resident of Currawang who was affected by offensive odour at their property. The report stated they have been enduring a putrid, sour, rotting smell for two days blowing in from the facility.	Not Specified	An assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour was undertaken. Veolia continues to refine its investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.
30/03/2022	8:00:00 am	20476	EPA Environmental Line	7140	Odour	Letter	Collector Road, Currawang	The EPA received a report to Environment Line from a resident of Collector Road Currawang who was affected by offensive odour at their property. The report stated Odour was noticed on 30/3/22, 8am coming from Woodlawn Bioreactor, wind was from the S about 7km/h and it was an off compost smell.	Not Specified	An assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour was undertaken. Veolia continues to refine its investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.
28/03/2022	9:30:00 am	20476	EPA Environmental Line	7039	Odour	Letter	Mooneys Road, Currawang	The EPA received reports to their Environment Line from a resident of Mooneys Road Currawang who was affected by offensive odour at their property. The reporter stated that the odour is a strong rubbish/gas smell brought to them by a strong SSE wind.	Not Specified	An assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour was undertaken. Veolia continues to refine its investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.
31/03/2022	9:30:00 am	20476	EPA Environmental Line	7122	Odour	Letter	Mooneys Road, Currawang	The EPA received reports to their Environment Line from a resident of Mooneys Road Currawang who was affected by offensive odour at their property. The reporter stated that the odour is a strong rubbish/gas smell brought to them by a strong SSE wind.	Approx 5 ½ hours	An assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour was undertaken. Veolia continues to refine its investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.
28/03/2022	6:30:00 am	20476	EPA Environmental Line	7128	Odour	Letter	Mooneys Road, Currawang	The EPA received reports to their Environment Line from a resident of Mooneys Road Currawang who was affected by offensive odour at their property. The reporter stated that the odour was very bad, smelling of rotting vegetation and sewerage, which is a regular occurrence at their property for the past three weeks.	Not Specified	An assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour was undertaken. Veolia continues to refine its investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.

Woodlawn Bioreactor Complaints Register

Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
31/03/2022	9:00:00 am	20476	EPA Environmental Line	7129	Odour	Letter	Mooneys Road, Currawang	The EPA received reports to their Environment Line from a resident of Mooneys Road Currawang who was affected by offensive odour at their property. The reporter stated that the odour was very bad, smelling of rotting vegetation and sewerage, which is a regular occurrence at their property for the past three weeks.	Approx 3 ½ hours	An assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour was undertaken. Veolia continues to refine its investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.
29/03/2022	8:44:00 am	11436	EPA Environmental Line	6995	Odour	Letter	Breadalbane Road, Collector	The EPA received a complaint this morning from a resident residing in Breadalbane Road, Collector who reported a "sulfur gas-like offensive odour" that was first observed at approximately 8:44am this morning.	Up to 1 hour	An operational odour source inspection was carried out for each of the individual Eco-Precinct facilities immediately following receipt of the complaint. The findings of the site inspections, combined with an assessment of meteorological data and operational activities was then undertaken in order to investigate the potential source or cause of odour. Although a number of improvement actions will be undertaken as a result of the site inspections, no unusual activities or conditions were identified.
28/03/2022	9:30:00 am	Unknown	EPA Environmental Line		Odour	Letter	Goulburn Street, Collector	The EPA received a report to Environment Line from a resident of Goulburn Street, Collector who was affected by an offensive odour. The reporter stated that 'the smell coming from Woodlawn is horrendous, you can't even have your doors or windows open due to the stench'.	Not Specified	An assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour was undertaken. Veolia recently met with the EPA to discuss odour management, particularly, measurement of hydrogen sulphide, and fugitive gas emissions to refine the monitoring and investigation of potential odour sources. The Independent Odour Audit fieldwork was also undertaken on site last week. A detailed odour complaint analysis will be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.
23/02/2022	9:09:00 am	11436	E-mail		Road Traffic	Letter	Tarago-Bungendore Road	The complainant reported that their spouse was travelling on the Tarago-Bungendore Road when they encountered an oncoming truck driving on their side of the road due to very poor condition of parts of the road.	Not Specified	This section of road has been identified as requiring urgent repair and Veolia understands road repairs are scheduled to commence shortly. In the interest of public safety Veolia customers have been asked to limit travel between Bungendore and Tarago prior to daylight hours.
23/03/2022	5:00:00 pm	11436	EPA Environmental Line	6945	Odour	Letter	Lucky Pass Road, Currawang	The EPA received a report to Environment Line from a resident of Tarago who was affected by an offensive odour at their property. The reporter stated that the odour was a lot like a rubbish tip smell and at the time of the incident there was strong easterly wind gusts.		An assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour was undertaken. Veolia continues to refine its investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.
22/03/2022	10:54:00 am	11436	Community Feedback Line		Odour	Letter	King Street, Tarago	Veolia received a report of odour from a resident of King Street, Tarago who advised that they had experienced a smell of rotting food allegedly coming from the Bioreactor. They rated the odour strength around 9/10.		Site management responded to the complainants location immediately following the report and was unable to detect any odour. An assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour was undertaken.
22/03/2022	9:10:00 am	11436	EPA Environmental Line	6848	Odour	Letter	Cullulla Road, Tarago	The EPA received a report to Environment Line from a resident of Cullulla Road, Tarago who was affected by an offensive odour at their property. The reporter stated that the odour is very strong, and the weather at the time of the incident was sunny with no wind.		An assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour was undertaken. Veolia continues to refine its investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.

Woodlawn Bioreactor Complaints Register

Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
22/03/2022	7:30:00 am	20476	EPA Environmental Line	6834	Odour	Letter	Willow Glen Road, Lower Boro	The EPA received a report to Environment Line from a resident of Willow Glen Road, Lower Boro who was affected by offensive odour at their property. The reporter stated that the odour has a sickly sweet rotting smell and that the wind was slight at the time of the incident.		An assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour was undertaken. Veolia continues to refine its investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.
19/03/2022	8:00:00 am	11436	EPA Environmental Line	6836	Odour	Letter	Collector Road, Currawang	The EPA received a complaint from a resident residing in Collector Rd, Currawang. The complainant reported a strong odour that was first observed at approximately 8:00am.		An assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour was undertaken. Veolia continues to refine its investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.
18/03/2022	6:30:00 am	11436	EPA Environmental Line	6838	Odour	Letter	Mooneys Road, Currawang	The EPA received a complaint from a resident residing in Mooneys Rd, Currawang. The complainant reported "a distinct smell of rubbish" that the complainant alleged was coming from the Woodlawn Bioreactor.		An assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour was undertaken. Veolia continues to refine its investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.
18/03/2022	8:23:00 am	11455	E-mail		Road Traffic	Letter	Bungendore Road, Tarago	Veolia received an email from a resident of the Tarago area reporting that as they were following a trucked container out from the Crisps Creek intermodal, they noticed it was leaking liquid.	Not Applicable	The container identified was immediately removed from service for inspection and investigation inot the incident was carried out. As the waste had been containerised and stored in Sydney for a period of time, Veolia had already implemented measures to reduce the impact on the community and environment.
18/03/2022	8:30:00 am	Unknown	EPA Environmental Line	6768	Odour	Letter	Unknown address	The EPA received a report to Environment Line on 18 March 2022 from a resident of an unknown address who was affected by offensive odour at their property. The report stated odour from Bioreactor was affecting caller at home again this morning.		An assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour was undertaken, however due to the lack of information in relation to the complainants location, it is impossible to identify if any emissions were present and/or impacting on the complainant at the time of the report of odour.
18/03/2022	6:30:00 am	11436	EPA Environmental Line	6813	Odour	Letter	Mooneys Road Currawang	The EPA received a report to Environment Line on from a resident of Mooneys Lane, Currawang. The reporter stated 'strong and repellent odour has been a regular occurrence for the past two weeks at their property.		An assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour was undertaken. Veolia continues to refine its investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.

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Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
18/03/2022	6:30:00 am	11436	EPA Environmental Line	6781	Odour	Letter	Leahys Lane, Tarago	The EPA received a report to Environment Line on from a resident of Leahys Lane Tarago. The reporter stated that odour was affecting the caller at home again today. Very strong (5 out of 6). First noticed at 6.30am and had largely dissipated by 9am.		An assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour was undertaken. Veolia continues to refine its investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.
17/03/2022	2:30:00 pm	11436	EPA Environmental Line	6762	Odour	Letter	Braiwood Road, Tarago	The EPA received a report to Environment Line from a resident of Braidwood Road Tarago (Tarago area Women's Shed) who was affected by offensive odour at their property. The complainant noticed the odour around 02:30 pm this afternoon. It is rotten garbage odour.		Veolia site management and a number of other operational staff were situated at various locations throughout Tarago during the course of the day due to the management of the arrival of the first train from Sydney following the rail line closures. A number of residents and workers in the area at the time were spoken to who had indicated that they had not been impacted by the arrival of the train or truck movement in any way during this time. An assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour was undertaken.
11/03/2022	9:00:00 pm	20476	EPA Environmental Line	6700	Odour	Letter	Mooneys Road, Currawang	The EPA received a report of odour from a resident of Mooneys Road, Currawang who was affected by offensive odour allegedly coming from Veolia. The breeze was coming from a S/SE direction and it was slightly overcast.		Veolia continues to refine it's investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants.
10/03/2022	8:00:00 am	20476	EPA Environmental Line	6630	Odour	Letter	Mooneys Road, Currawang	The EPA received a report of odour from a resident of Mooneys Road, Currawang. The weather conditions were reported as cool and overcast with a light breeze from a SE direction.		Veolia continues to refine it's investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants.
09/03/2022	6:30:00 pm	11436	EPA Environmental Line	6632	Odour	Letter	Covan Creek Road, Lake Bathurst	The EPA received a report of odour from a resident of Covan Creek Road, Lake Bathurst. The reporter stated that the odour had the characteristic of gas or petrol, is causing headaches, and is more intense following the recent heavy rain. The odour is reported as permeating through the reporters home, and windows and doors need to be kept closed.		Veolia continues to refine it's investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants.
07/03/2022	2:30:00 pm	20476	EPA Environmental Line		Odour	Letter	Mooneys Road, Currawang	The EPA received a report of odour from a resident of 96 Mooneys Road, Currawang. The complainant stated that the odour was pretty strong that morning and the weather is overcast and there were strong southerly winds today. The smell is a sickly sweet rubbish smell that has been consistent over the past week.		Veolia continues to refine it's investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants.
06/03/2022	3:00:00 pm	11436	EPA Environmental Line	6579	Odour	Letter	Breadalbane Road, Collector	The EPA received a report of odour from a resident of Breadalbane Road, Collector. The complainant stated that the odour on that day was like rotting garbage and sulphur, which had unusually infiltrated the house. The odour strength was reported as very strong (5 out of 6) and the weather conditions were reported as rainy with a 17km/h SSE breeze.		Veolia continues to refine it's investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants.
06/03/2022	6:30:00 am	11436	EPA Environmental Line	6537	Odour	Letter	Breadalbane Road, Collector	The EPA received a report of odour from a resident of Breadalbane Road, Collector. The complainant stated that the odour is offensive and sickening and inhibits the residents from utilising their property. It is a rotten egg garbage smell. The odour is worse when the weather is overcast and windy.		Veolia continues to refine it's investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants.

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Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
06/03/2022	10:27:00 am	11436	EPA Environmental Line	6538	Odour	Letter	Currawang Road, Currawang	The EPA received a report of odour from a resident of Currawang Road, Currawang. The complainant stated that the odour left a metallic taste in the mouth and that the wind at the time of the incident was SSE blowing at 28km/h.		Veolia continues to refine it's investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants.
05/03/2022	3:00:00 am	11436	EPA Environmental Line	6835	Odour	Letter	Taylors Creek Road, Tarago	The EPA received a complaint from a resident residing on Taylors Creek Rd, Tarago. The complainant reported a strong odour that was observed between approximately 3:00am and 9:00am that morning.		
04/03/2022		11436	EPA Environmental Line	6462	Odour	Letter	Breadalbane Road, Collector	The EPA received a report of odour from a resident of Breadalbane Road, Collector. The complainant rated the odour strength when they went outside of their property around 8/10.		Veolia continues to refine it's investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants.
03/03/2022	08:30	11436	EPA Environmental Line	6460	Odour	Letter	Breadalbane Road, Collector	The EPA received a report of odour from a resident of Breadalbane Road, Collector. The reporter stated that the odour was pretty strong that morning, rated the odour strength around 5/6 and was too unpleasant to be outside. The reporter advised that at the time of the incident the weather was cloudy and overcast with a light breeze.		Veolia continues to refine it's investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants.
21/02/2022	8:35:00 am	11436	EPA Environmental Line	6439	Odour	Letter	Boro Road, Boro	The EPA received a report of odour from a resident of Boro Road, Boro. The complainant advised that this was their first report although they have smelt the odour here once before and they were very concerned that the odour has reached their location in Boro. The odour was like rotten eggs or sulphide.		Veolia continues to refine it's investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants.
21/02/2022	8:35:00 am	11436	E-mail		Odour	Letter	Boro Road, Boro	Veolia received a report of odour from a resident of Boro Road, Boro. The complainant advised that the smell was too unpleasant to sit outside for breakfast as they normally would.	4 hours	Veolia continues to refine it's investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants.
18/02/2022	7:30:00 am	11436	Community Feedback Line		Odour	Letter	Braidwood Road, Tarago	Veolia received a report of odour from a resident of Braidwood Road, Tarago. The complainant advised that the stench was extremely unpleasant and was so bad that they had to rewash clothes that were hanging on their washing line.	Not Specified	Veolia continues to refine it's investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants.
18/02/2022	6:58:00 am	11436	EPA Environmental Line	6172	Odour	Letter	Braidwood Road, Tarago	The EPA received a report of odour from a resident of Braidwood Road, Tarago. The complainant advised that all windows and doors in their home had to be shut due to the strength of the odour and was giving the Reporter asthma.	Not Specified	Veolia continues to refine it's investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants.
10/02/2022	6:00:00 am	11436	EPA Environmental Line	6041	Odour	Letter	Mayfield Road, Tarago	The complainant reported an awful stench affecting the caller at home, a few kilometres out of town. They advised that odours had not been too bad for a while but, more recently, every foggy morning the odour has been overpowering, which is several times a week.	Up to 3 hours	Veolia continues to refine it's investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.
10/02/2022	6:00:00 am	11436	EPA Environmental Line	5999	Odour	Letter	Braidwood Road, Tarago	The complainant reported noticing an odour early this morning, around 6am that was getting worse. They reported that it smelt like rotten garbage which was very strong. There was a light westerly wind outside.	Up to 3 hours	Veolia continues to refine it's investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.

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Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
10/02/2022	5:30:00 am	11436	EPA Environmental Line	6000	Odour	Letter	Tarago	The complainant reported a very strong rotting waste odour coming from Woodlawn Bioreactor. The reporter was visiting the area in Tarago and said that you could not walk outside.	Up to 3 hours	Veolia continues to refine it's investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.
10/02/2022	5:30:00 am	11436	EPA Environmental Line	6021	Odour	Letter	Willow Glen Road, Willow Glen	The complainant reported a sick, clawing, sweet garbage smell from Woodlawn Eco Precinct. The odour entered through an open window and was extremely strong in and outside. They advised that the odour tends to dissipate around 10:30-11:00 when the temperature increased but comes back later in the day/evening when it gets cooler.	Not Specified	Veolia continues to refine it's investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.
10/02/2022	7:30:00 am	11436	E-mail		Odour	Letter	Boro Road, Tarago	The complainant emailed Veolia directly to report that whilst traveling from their address in Lower Boro to Tarago a rotten garbage odour was evident, allegedly coming from the Woodlawn Bioreactor.	2 hours	Veolia continues to refine it's investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.
10/02/2022	8:19:00 am	11436	Community Feedback Line		Odour	Letter	Mt Fairy Road, Mt Fairy	The complainant advised that the odour was first noticed at 1: 30am and was still evident at the time of the report. The weather was reported to be very warm and still when the odour was present.	Up to 7 hours	An operational odour source site inspection was carried out of all Woodlawn Eco-Precinct upon receipt of the report of odour and an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour was carried out.
09/02/2022	4:00:00 am	11436	EPA Environmental Line	6173	Odour	Letter	Goulburn Street, Tarago	The EPA received a report of odour from a resident of Goulburn Street, Tarago. The complainant advised that this is the first time for a while that the odour has been so strong and so strong that the rest of the family stayed inside until it dissipated. The weather at the time of the odour incident was reported as a slight breeze from the direction of the facility, with drizzle overnight and fine in the morning.	Not Specified	Veolia continues to refine it's investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants.
09/02/2022	5:30:00 am	11436	EPA Environmental Line	5985	Odour	Letter	Cullulla Road, Tarago	The complainant advised that with a light wind, an odour was smelt from a north west direction. The reporters property is situated in straight line 15km from the Woodlawn.	1/2 hours	Veolia continues to refine it's investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.
09/02/2022	6:50:00 am	11436	EPA Environmental Line	6029	Odour	Letter	Willow Glen Road, Lower Boro	The complainant was woken by a strong odour described as "sickly sweet rotten garbage smell" at 3:00am that was still present when the call was received at 6:50am. The complainant alleged that the odour was coming from the Woodlawn Bioreactor.	4 hours	Veolia continues to refine it's investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.
09/02/2022	6:00:00 am	11436	EPA Environmental Line	6030	Odour	Letter	Leahys Lane, Tarago	The complainant was affected by an odour described as a "rotting rubbish odour with a metallic tang" that intensified during the morning (between 6:00am and 9:00am). The complainant alleged that the odour was coming from the Woodlawn Bioreactor.	2 hours	Veolia continues to refine it's investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.

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Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
09/02/2022	10:00:00 pm	11436	E-mail		Odour	Letter	Rosebery Street,Tarago	The complainant emailed Veolia directly to report that whilst all of their windows were open to cool the house down that night, the house was filled with a bad odour allegedly coming from the Woodlawn Bioreactor.	Not Specified	Veolia continues to refine it's investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.
07/02/2022	8:30:00 am	11436	EPA Environmental Line	6027	Odour	Letter	Tarago Public School	The complainant was dropping children at the School at approximately 8:30am when they observed a strong odour described as "rotten garbage". The complainant alleged that the odour was coming from the Woodlawn Bioreactor.	Not Specified	Veolia continues to refine it's investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.
06/02/2022	7:58:00 am	11436	EPA Environmental Line	6028	Odour	Letter	Collector Road, Currawang	The complainant reported odour described as a very strong and pervasive "metallic compost smell" that was first observed at approximately 7:58am. The complainant alleged that the odour was coming from the Woodlawn Bioreactor.	Not Specified	Veolia continues to refine it's investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.
04/02/2022	8:30:00 am	11436	EPA Environmental Line	6025	Odour	Letter	Tarago Public School	The EPA received a complaint on the morning of the 4th February 2022 relating to an odour observed at the Tarago Public School. The complainant was dropping children at the School at approximately 8:30am when they observed a strong odour described as "rotten garbage". The complainant alleged that the odour was coming from the Woodlawn Bioreactor.	Not Specified	Veolia continues to refine it's investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.
04/02/2022	7:30:00 am	11436	EPA Environmental Line	6026	Odour	Letter	Collector Road, Currawang	The complainant reported odour described as "a metallic foul smell" that was first observed at approximately 7:30am. The complainant alleged that the odour was coming from the Woodlawn Bioreactor.	Not Specified	Veolia continues to refine it's investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.
01/02/2022	7:30:00 am	11436	EPA Environmental Line	5864	Odour	Letter	Rosebery Street, Tarago	The complainant reported odour described as "a moderate strength landfill odour" that was first observed at approximately 7:30am. The complainant alleged that the odour was coming from the Woodlawn Bioreactor.	Not Specified	Veolia continues to refine it's investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.
01/02/2022	4:30:00 am	11436	EPA Environmental Line	6024	Odour	Letter	Lumley Road, Lake Bathurst	The complainant was woken by strong odour (undescribed) at 4: 30am that remained present until their departure from the residence at approximately 8:30am. The complainant alleged that the odour was coming from the Woodlawn Bioreactor.	4 hours	Veolia continues to refine it's investigation process relating to odour issues to address potential odour sources. Veolia follows the continuous improvement methodology and is constantly implementing changes to the operations based on information provided by site monitoring and independent consultants. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an assessment of environmental parameters.
01/02/2022	6:00:00 am	11436	EPA Environmental Line	5836	Odour	Letter	Leahys Lane, Tarago	The complainant advised that the odour started at 6:00am and continued to be experienced until 8:30am. They rated the odour level a 6 out of 6 and said that the weather was still and cool, there was thick fog, and that the odour got less as the fog cleared but was still bad at time of departure.	2 1/2 hours	Odour management continues to be a main focus at the Woodlawn Eco-Precinct. Veolia is refining it's investigation process of odour issues in the community, particularly surrounding the most common complaints, to assess the extent to which odour is present in the community.

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Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
31/01/2022	6:00:00 am	11436	EPA Environmental Line	5848	Odour	Letter	Willow Glen Road, Lower Boro	The complainant advised that the odour started at 6:00am and had dissipated around 11am when the wind picked up. They noticed the smell again that day at 5pm. The weather was reported as hot and still when the odour was present.	5 hours	Odour management continues to be a main focus at the Woodlawn Eco-Precinct. Veolia is refining it's investigation process of odour issues in the community, particularly surrounding the most common complaints, to assess the extent to which odour is present in the community.
19/1/2022	9:25:00 pm	11436	EPA Environmental Line	5671	Odour	Letter	Collector Road, Currawang	The EPA received a report to their Environment Line from a resident of Collector Road, Currawang, who was affected by offensive odour. The complainant reported that the odour had a metallic foul smell and at the time of the incident the wind was from the south east about 20km/hr.	Not Specified	Odour management continues to be a main focus at the Woodlawn Eco-Precinct. Veolia is refining it's investigation process of odour issues in the community, particularly surrounding the most common complaints, to assess the extent to which odour is present in the community. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an
17/1/2022	8:00:00 am	11436	EPA Environmental Line	5714	Odour	Letter	Leahys Lane, Tarago	The EPA received a report to their Environment Line from a resident of Leahys Lane, Tarago, who was affected by offensive odour allegedly coming from the Woodlawn Bioreactor. The complainant described the odour as "strong rotting garbage".	2 1/2 hours	Odour management continues to be a main focus at the Woodlawn Eco-Precinct. Veolia is refining it's investigation process of odour issues in the community, particularly surrounding the most common complaints, to assess the extent to which odour is present in the community. A detailed odour complaint analysis will also be undertaken as part of this year's Independent Odour Audit that will include an
17/1/2022	10:51:00 pm	11436	EPA Environmental Line	5590	Odour	Letter	Cullulla Road, Tarago	The EPA received a report to their Environment Line from a resident of Cullulla Road, Tarago, who was affected by offensive odour.	Not Specified	Odour management continues to be a main focus at the Woodlawn Eco-Precinct. Veolia is refining it's investigation process of odour issues in the community, particularly surrounding the most common complaints, to assess the
11/1/2022	6:00:00 am	11436	EPA Environmental Line	5352	Odour	Letter	Taylors Creek Road, Tarago	The EPA received a report to their Environment Line from a resident of Taylors Creek Road, Tarago, who was affected by offensive odour. The complainant reported that the odour had the character of gas.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
10/1/2022	1:00:00 pm	11436	EPA Environmental Line	5352	Odour	Letter	Taylors Creek Road, Tarago	The EPA received a report to their Environment Line from a resident of Taylors Creek Road, Tarago, who was affected by offensive odour. The complainant reported that the odour had the character of gas.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
21/12/2021	3:19:00 pm	11436	EPA Environmental Line	5352	Odour	Letter	Mulwaree Street, Tarago	The EPA received a report to their Environment Line from a resident of Mulwaree Street, Tarago, who was affected by offensive odour. The complainant reported that the odour had the character of rubbish/gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
20/12/2021	10:30:00 am	11436	EPA Environmental Line	5148	Odour	Letter	Willow Glen Road, Lower Boro	The EPA received a report to their Environment Line from a resident of Willow Glen Road, Lower Boro, who was affected by offensive odour. The complainant reported that the Odour is not strong but is very unpleasant.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
20/12/2021	6:30:00 am	11436	EPA Environmental Line	5137	Odour	Letter	Roseview Rd, Mount Fairy	The EPA received a complaint this morning from a resident residing in Roseview Rd, Mount Fairy. The complainant reported a odour described as " a thick foul odour of a sweet pungent smell" that was first observed at approximately 6:30am.	30 minutes	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
16/12/2021	8:14:00 am	11436	EPA Environmental Line	5103	Odour	Letter	Mulwaree Street, Tarago	The EPA received a report to its Environment Line from a resident of Mulwaree Street, Tarago who was affected by an offensive odour.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
15/12/2021	6:00:00 am	11436	EPA Environmental Line	5104	Odour	Letter	Covan Creek Road, Lake Bathurst	The EPA received a report to its Environment Line from a resident of Covan Creek Road, Lake Bathurst who was affected by an offensive odour. The reporter described the odour character as a rubbish smell.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
15/12/2021	Not Specified	11436	EPA Environmental Line	5092	Odour	Letter	Tarago	The EPA received a report to its Environment Line from a resident of Tarago. who was affected by offensive odour. The complainant reported an odor described as "garbage combined with dirt and mushrooms".	5 hours	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
15/12/2021	8:35:00 pm	11436	EPA Environmental Line	5091	Odour	Letter	Mulwaree Street, Tarago	The EPA received a report to its Environment Line from a resident of Mulwaree Street, Tarago. The complainant reported a "very strong odour" that commenced around 8:35pm that evening that wafted into the residence and caused the complainant to close up	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.

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Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
15/12/2021	9:22:00 am	11436	EPA Environmental Line	5051	Odour	Letter	Leahys Lane, Tarago	The EPA received a report to its Environment Line from a resident of Leahys Lane, Tarago who was affected by offensive odour. The odour was reported to have the character of rotting garbage and rated the smell 5/6. The weather was described as very still.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
14/12/2021	6:00:00 am	11436	EPA Environmental Line	5052	Odour	Letter	Cullulla Road, Tarago	The EPA received a report to its Environment Line from a resident of Cullulla Road, Tarago who was affected by offensive odour. The reporter described an unpleasant strong garbage smell that has an overpowering egg smell.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
14/12/2021	6:00:00 am	11436	EPA Environmental Line	4990	Odour	Letter	Leahys Lane, Tarago	The EPA received a report to its Environment Line from a resident of Leahys, Tarago who was affected by offensive odour. The odour was reported to have the character of rotting garbage and was strong for two hours between the hours of 6am - 8am.	2 hours	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
10/12/2021	2:30:00 pm	11436	EPA Environmental Line	4986	Odour	Letter	Braidwood Road, Tarago	The EPA received a report to its Environment Line from a resident of Braidwood Road, Lake Bathurst, who was affected by offensive odour commencing about 2:30pm. Rain has been ongoing all day.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
9/12/2021	6:29:00 pm	11436	EPA Environmental Line	5003	Odour	Letter	Currawang Road, Currawang	The EPA received a report to its Environment Line from a resident of Currawang Road, Currawang, who was affected by offensive odour. The odour was reported to be metallic in character.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
04/12/2021	7:30:00 am	11436	EPA Environmental Line	4708	Odour	Letter	Taylors Creek Road, Tarago	The EPA received a report to its Environment Line from a resident of Taylors Creek Road, Tarago Tarago, who was affected by an offensive odour allegedly coming from the Woodlawn Eco-precinct. They advised that the odour could be smelled about 1.5 km away from their home.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
30/11/2021	5:15:00 am	11436	EPA Environmental Line	4708	Odour	Letter	Collector Road, Tarago	The EPA received calls to its Environment Line from a resident of Collector Road, Tarago complaining about an odour. The odour had the character of rotten garbage and was rated the intensity of the odour as an 8.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
28/11/2021	7:20:00 am	11436	EPA Environmental Line	4669	Odour	Letter	Collector Road, Tarago	The EPA received calls to its Environment Line from a resident of Collector Road, Tarago complaining about an odour. The odour had the character of “rotten rubbish” and has alleged that the odour was coming from the Woodlawn Bioreactor.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
11/11/2021	7:30:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Tarago area complaining about an odour. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
08/11/2021	8:50:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Tarago area complaining about an odour. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
08/11/2021	8:30:00 am	11436	EPA Environmental Line		Odour	Letter	Lower Boro	The EPA received calls to its Environment Line from residents in the Tarago area complaining about an odour. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
01/11/2021	9:00:00 am	11436	E-mail		Odour	Letter	Willandra Lane, Tarago	Veolia received an email from a resident of Tarago, reporting a strong odour allegedly coming from the Bioreactor. It came in between 9-9.15am and was still apparent at 10am.	1 hour	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
31/10/2021	7:00:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Tarago area complaining about an odour. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
28/10/2021	8:00:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Tarago area complaining about an odour. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.

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Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
28/10/2021	8:40:00 am	11436	Community Feedback Line		Odour	Letter	Mount Fairy Road, Mount Fairy	Veolia received a call to its Community Feedback Line from a resident of Mt Fairy reporting a pungent smell in the air allegedly coming from the Bioreactor.	Not Specified	Immediately following the report of odour, site management attended the complainants location in an attempt to identify the odour. An odour source site inspection was also carried out to ascertain any operational aspects that may have contributed to the source of odour at the time of detection.
27/10/2021	8:50:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Tarago area complaining about an odour. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
27/10/2021	8:50:00 am	11436	E-mail		Odour	Letter	Braidwood Road, Tarago	Veolia received an email from reporting a smell of rotten garbage allegedly coming from the Bioreactor. The complainant advised it was smelt about 4-5kms south of Tarago on the Braidwood Road.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
23/10/2021	5:03:00 pm	11436	EPA Environmental Line		Odour	Letter	Lower Boro	The EPA received calls to its Environment Line from residents in the Tarago area complaining about an odour. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
23/10/2021	7:30:00 am	11436	E-mail		Odour	Letter	Boro Road, Lower Boro	Veolia received an email from a resident of Lower Boro reporting a very faint smell allegedly coming from the Bioreactor. They advised there had been a very heavy fog overnight.	1 hour	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
22/10/2021	11:52:00 am	11455	E-mail		Road Traffic	Letter	Bungendore Road, Tarago	Veolia received an email from a resident of the Tarago area reporting that that there was water on the road, tracking from the IMF to the Collector Road turnoff that could have been from a container in transit.	Not Specified	The section of the road was inspected and showed no indication of residue which would indicate that the liquid was most likely water from the top of the container that had since evaporated. Based on Veolia's investigations, there is no evidence that indicates that the liquid on the road leaked from within a container.
20/10/2021	9:00:00 am	11436	EPA Environmental Line		Odour	Letter	Currawang	The EPA received a call to its Environment Line from a resident in the Tarago area complaining about an odour. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
14/10/2021	10:26:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received a call to its Environment Line from a resident in the Tarago area complaining about an odour. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
13/10/2021	8:01:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Tarago area complaining about an odour. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
08/10/2021	6:00:00 pm	11436	Community Feedback Line		Odour	Letter	Braidwood Road, Tarago	Veolia received a call to its Community Feedback Line from a resident of Tarago reporting a stench allegedly coming from the Bioreactor. They advised it was particularly strong over the night of 08/10 and early morning of 09/10.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
08/10/2021	6:30:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received a call to its Environment Line from a resident in the Tarago area complaining about an odour. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
06/10/2021	1:03:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Tarago area complaining about an odour. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
06/10/2021	7:00:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Tarago area complaining about an odour. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
06/10/2021	7:46:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Tarago area complaining about an odour. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
05/10/2021	11:25:00 am	11436	Community Feedback Line		Odour	Letter	Braidwood Road, Tarago	Veolia received a call to its Community Feedback Line from a resident of Tarago reporting a stench allegedly coming from the Bioreactor. They advised that they hadn't smelt it often recently, but when it does come, the smell is intense.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.

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Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
03/10/2021	9:34:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Tarago area complaining about an odour. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
03/10/2021	3:00:00 pm	11436	EPA Environmental Line		Odour	Letter	Lower Boro	The EPA received calls to its Environment Line from residents in the Tarago area complaining about an odour. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
02/10/2021	10:00:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA has received calls to its Environment Line from residents in the Tarago area who are complaining about an odour. This caller has generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
01/10/2021	8:00:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA has received calls to its Environment Line from residents in the Tarago area who are complaining about an odour. This caller has generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
01/10/2021	10:45:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA has received calls to its Environment Line from residents in the Tarago area who are complaining about an odour. This caller has generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
01/10/2021	10:45:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA has received calls to its Environment Line from residents in the Tarago area who are complaining about an odour. This caller has generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
29/09/2021	7:25:00 am	11436	Community Feedback Line		Odour	Letter	Taylors Creek Road, Tarago	Veolia received a call to its Community Feedback Line from a resident of Taylors Creek Road, Tarago reporting that there an odour had come over recently despite being unnoticeable whilst outside earlier in the morning.	Not Specified	Immediately following the report of odour, site management attended the complainants location in an attempt to identify the odour. An odour source site inspection was also carried out to ascertain any operational aspects that may have contributed to the source of odour at the time of detection.
23/09/2021	6:30:00 pm	11436	EPA Environmental Line		Odour	Letter	Goulburn Street, Tarago	The EPA has received a call to its Environment Line from a resident of Tarago complaining about an odour. No further details were provided.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
22/09/2021	12:00:00 pm	11436	EPA Environmental Line		Odour	Letter	Lucky Pass Road, Currawang	The EPA has received a call to its Environment Line from a resident of Tarago complaining about an odour. No further details were provided.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
22/09/2021	4:50:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA has received a call to its Environment Line from a resident of Tarago reporting an odour generally described as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
22/09/2021	6:00:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA has received a call to its Environment Line from residents in the Tarago area who are complaining about an odour. This caller has generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
22/09/2021	6:30:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA has received a call to its Environment Line from residents in the Tarago area who are complaining about an odour. This caller has generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
22/09/2021	1:24:00 pm	11436	Community Feedback Line		Odour	Letter	Carneys Road, Currawang	Veolia received a call to its Community Feedback Line from a resident of Currawang reporting that there was an odour detected on their property that was noticed the day prior (21/09) after the rain had cleared, and again today at the time of their call.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
21/09/2021	6:21:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA has received a call to its Environment Line from residents in the Tarago area who are complaining about an odour. This caller has generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
15/09/2021	8:47:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents of Tarago reporting an odour described as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.

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Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
14/09/2021	3:44:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents of Tarago reporting an odour described as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
12/09/2021	12:00:00 pm	11436	EPA Environmental Line		Odour	Letter	Mulwaree Street, Tarago	The EPA received a call to its Environment Line from a resident of Mulwaree Street, Tarago who reported a strong rotten garbage odour at their property. They reported that issue is ongoing, occurring every few days.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
08/09/2021	7:05:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received a call to its Environment Line from a resident of Tarago complaining about an odour. They generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
06/09/2021	10:00:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received a call to its Environment Line from a resident of Tarago complaining about an odour. They generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
06/09/2021	5:30:00 pm	11436	E-mail		Odour	Letter	Lake Bathurst	The complaint reported an offensive odour was smelled at Connen Hill, Lake Bathurst for the most of the day and particularly worse at 5.30pm.	Up to 8 hours	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
01/09/2021	11:00:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Tarago area who are complaining about an odour. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
01/09/2021	8:00:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Tarago area who are complaining about an odour. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
31/08/2021	9:40:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Tarago area who are complaining about an odour. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
31/08/2021	7:00:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Tarago area who are complaining about an odour. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
29/08/2021	9:30:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Tarago area who are complaining about an odour. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
29/08/2021	10:34:00 am	11436	Community Feedback Line		Odour	Letter	Mount Fairy Road, Mount Fairy	The complainant contacted the community feedback line to report that odour was evident when they went outside that morning.	Not Specified	Site management explained Veolia's commitment to seeking out new and innovative ways of reducing odours generated at the site. Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
25/08/2021	8:00:00 pm	11436	EPA Environmental Line		Odour	Letter	Lake Bathurst	The EPA received calls to its Environment Line from residents in the Tarago area who are complaining about an odour. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
25/08/2021	10:00:00 am	11436	EPA Environmental Line	EPA-2924	Odour	Letter	Braidwood Road, Lake Bathurst	The complainant reported a strong rotten garbage odour at their property at their property from 10.00am.	Not specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
24/08/2021	10:00:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Tarago area reporting an odour generally described as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not specified	An operational odour source inspection was conducted and based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.

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Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
18/08/2021	5:32:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Tarago area reporting an odour generally described as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not specified	An operational odour source inspection was conducted and based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
18/08/2021	7:32:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Tarago area reporting an odour generally described as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not specified	An operational odour source inspection was conducted and based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
18/08/2021	9:55:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Tarago area reporting an odour generally described as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not specified	An operational odour source inspection was conducted and based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
18/08/2021	10:25:00 am	11436	EPA Environmental Line	EPA-2774	Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Tarago area reporting an odour generally described as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not specified	An operational odour source inspection was conducted and based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
18/08/2021	10:27:00 am	11436	EPA Environmental Line		Odour	Letter	Mount Fairy	The EPA received calls to its Environment Line from residents in the Tarago area reporting an odour generally described as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not specified	An operational odour source inspection was conducted and based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
18/08/2021	10:15:00 am	11436	Community Feedback Line		Odour	Letter	Roseview Road, Mount Fairy	The complaint reporting an odour described as a sweet rotten rubbish, pickling type smell allegedly coming from the Bioreactor.	Not specified	An operational odour source inspection was conducted immediately following receipt of the odour complaints and based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
18/8/2021	9:55:00 am	11436	Community Feedback Line		Odour	Letter	Willandra Lane, Tarago	The complaint reporting an odour described as a putrid rubbish smell allegedly coming from the Bioreactor. They advised that it was the first time they had notced the smell in a long time.	Not specified	An operational odour source inspection was conducted immediately following receipt of the odour complaints and based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
17/08/2021	5:19:00 pm	11436	Community Feedback Line		Odour	Letter	King Street, Tarago	The complainant contacted Veolia's Community Feedback Line to report an odour allegedly coming from the Woodlawn Bioreactor.	Not specified	Site management explained Veolia's commitment to seeking out new and innovative ways of reducing odours generated at the site. Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
16/08/2021	4:32:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Tarago area reporting an odour generally described as being offensive with a strong sulphur-like, rotting garbage smell, and gassy.	Not specified	An operational odour source inspection was conducted and based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
13/08/2021	2:45:00 pm	11436	Community Feedback Line		Road Traffic	Letter	Collector Road/Bungendore Road	The complainant reported that a truck proceeded to pull out in front of here at the intersection causing her to slow down abruptly.	Not Specified	CCTV footage was accessed to potentially identify offending waste transporter. Site management made contact with all contractors to reiterate Veolia transport code of conduct expectations.
10/08/2021	11:45:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received a call to its Environment Line from a resident in the Tarago area reporting an odour generally described as being offensive with a strong sulphur-like, rotting egg smell.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
04/08/2021	6:33:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Lower Boro, and Tarago area reporting an odour generally described as being offensive with a strong sulphur-like, rotting garbage smell, and grass-like.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.

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Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
03/08/2021	12:00:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Tarago area reporting an odour generally described as being offensive with a strong sulphur-like, rotting garbage smell, and grassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
03/08/2021	4:30:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Tarago area reporting an odour generally described as being offensive with a strong sulphur-like, rotting garbage smell, and grassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
02/08/2021	4:30:00 am	11436	EPA Environmental Line		Odour	Letter	Duralla Place, Mount Fairy	The complainant reported that he could detect a strong landfill odour outside his home from about 4:30am this morning. He said the odour was still present at the time of his call to Environment Line. He said the odour was a mix of sweet and sour and rotten egg gas. He said he also reported the incident to Veolia directly.	3 ½ hours	Veolia's increased efforts to eliminate odour emissions was explained to the complainant over an earlier phone call. Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
02/08/2021	4:30:00 am	11436	Phone (Direct)		Odour	Letter	Duralla Place, Mount Fairy	The complainant contacted Veolia management directly to report that an odour allegedly coming from the Bioreactor. They advised it tends to come over on crisp, cool nights.	4 ½ hours	Veolia's increased efforts to eliminate odour emissions was explained to the complainant in detail. Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
01/08/2021	8:30:00 pm	11436	EPA Environmental Line		Odour	Letter	Leahys Lane, Tarago	On 3 Sep 2021, the EPA reported that the complainant was affected by an offensive odour that they alleged was coming from the Woodlawn Bioreactor on 1st Aug 2021. It was described as smelling like burning rubber, metallic and rotten garbage.	Not Specified	Given the time that has elapsed since the report was made, and noting that another incident had already been investigated on the same date, no follow up or further action can be taken by Veolia at this point.
01/08/2021	8:30:00 am	11436	EPA Environmental Line		Odour	Letter	Lower Boro	The EPA received calls to its Environment Line from residents in the Lower Boro, and Tarago area reporting an odour generally described as being offensive with a strong sulphur-like, rotting garbage smell, and grass-like.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
01/08/2021	8:30:00 am	11436	E-mail		Odour	Letter	Boro Road, Lower Boro	The complainant emailed Veolia to report an odour allegedly coming from the Woodlawn Bioreactor. They reported the odour to be between 2/10 and 4/10, with a rotten garbage smell.	2-3 hours	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
31/07/2021	8:00:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Tarago area reporting an odour generally described as being offensive with a strong sulphur-like, rotting garbage smell, and grassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
31/07/2021	9:48:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Tarago area reporting an odour generally described as being offensive with a strong sulphur-like, rotting garbage smell, and grassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
30/07/2021	9:22:00 pm	11436	EPA Environmental Line		Odour	Letter	Lower Boro	The EPA received calls to its Environment Line from residents in the Lower Boro, and Tarago area reporting an odour generally described as being offensive with a strong sulphur-like, rotting garbage smell, and grass-like.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
30/07/2021	8:30:00 am	11436	EPA Environmental Line		Odour	Letter	Leahys Lane, Tarago	The complainant reported a strong odour at their property that smelled like a combination of rotting garbage and burning. They advised that it was really acrid, affecting their throat.	Not Specified	Site management were in the Tarago Village between 8:00am and 8:15am carrying out an odour survey and noticed that a very faint smell of gas was evident and wind was almost undetectable. Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
29/07/2021	8:40:00 am	11436	Community Feedback Line		Odour	Letter	Tarago Village	The complainant contacted Veolia's Community Feedback Line to report an odour allegedly coming from the Woodlawn Bioreactor. They reported that they had noticed a strong sulphur-like smell whilst driving through the Tarago Village.	Not Specified	Veolia's increased efforts to eliminate odour emissions was explained to the complainant in detail. Site management also undertook an odour survey in the Village and perimeter of the site to better identify the source of odour.
28/07/2021	5:30:00 am	11436	EPA Environmental Line		Odour	Letter	Lower Boro	The EPA received calls to its Environment Line from residents in the Lower Boro, and Tarago area reporting an odour generally described as being offensive with a strong sulphur-like, rotting garbage smell, and grass-like.	11 1/2 hours	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
28/07/2021	5:30:00 am	11436	E-mail		Odour	Letter	Boro Road, Lower Boro	The complainant emailed Veolia to report an odour allegedly coming from the Woodlawn Bioreactor. They reported the odour to be between 2/10 and 4/10, with a rotten garbage smell.	12 hours	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.

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Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
23/07/2021	10:30:00 am	11436	Community Feedback Line		Odour	Letter	Mount Fairy Road, Mount Fairy	The complainant contacted Veolia's Community Feedback Line to report an odour allegedly coming from the Woodlawn Bioreactor. They reported that they had noticed an odour when they went outside that smelt like a mix of sewerage and burning plastic.	Not Specified	Veolia's increased efforts to eliminate odour emissions was explained to the complainant in detail. Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
22/07/2021	9:00:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Lower Boro, and Tarago area reporting an odour generally described as being offensive with a strong sulphur-like, rotting garbage smell, and grass-like.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
22/07/2021	6:15:00 am	11436	E-mail		Road Traffic	Letter	Tarago-Bungendore Road	The complainant reported that their spouse was travelling on the Tarago-Bungendore Road between 0615 and 0645, when they encountered an oncoming truck driving on their side of the road.	Not Applicable	This section of road has been identified as requiring urgent repair and Veolia understands road repairs are scheduled to commence shortly. In the interest of public safety Veolia customers have been asked to limit travel between Bungendore and Tarago prior to daylight hours.
22/07/2021	6:15:00 am	11436	E-mail		Road Traffic	Letter	Tarago-Bungendore Road	The complainant reported that their spouse was travelling on the Tarago-Bungendore Road between 0615 and 0645, when they encountered an oncoming truck driving on their side of the road.	Not Applicable	This section of road has been identified as requiring urgent repair and Veolia understands road repairs are scheduled to commence shortly. In the interest of public safety Veolia customers have been asked to limit travel between Bungendore and Tarago prior to daylight hours.
22/07/2021	9:00:00 am	11436	E-mail		Odour	Letter	Tarago Township	The complainant contacted Veolia directly via email to report an odour allegedly coming from the Woodlawn Bioreactor. They advised that the odour smelled of rotten garbage and was 8/10 strong.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
22/07/2021	8:31:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Tarago area who are complaining about an odour. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
22/07/2021	9:55:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Tarago area who are complaining about an odour. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
22/07/2021	9:30:00 am	11436	Community Feedback Line		Odour	Letter	King Street, Tarago	The complainant contacted Veolia's Community Feedback Line to report an odour allegedly coming from the Woodlawn Bioreactor. They advised that the odour was so strong that it caused a headache and would most likely have been brought over as the wind picked up.	1 hour	Veolia's increased efforts to eliminate odour emissions was explained to the complainant in detail. Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
21/07/2021	6:15:00 am	11436	E-mail		Road Traffic	Letter	Tarago-Bungendore Road	The complainant was on the way to Canberra from Tarago on the Tarago-Bungendore Road between 0615 and 0645, when a truck allegedly travelling to Woodlawn was on the wrong side of the road.	Not Applicable	This section of road has been identified as requiring urgent repair and Veolia understands road repairs are scheduled to commence shortly. In the interest of public safety Veolia customers have been asked to limit travel between Bungendore and Tarago prior to daylight hours.
21/07/2021	6:15:00 am	11436	E-mail		Road Traffic	Letter	Tarago-Bungendore Road	The complainant was on the way to Canberra from Tarago on the Tarago-Bungendore Road between 0615 and 0645, when a truck allegedly travelling to Woodlawn was on the wrong side of the road.	Not Applicable	This section of road has been identified as requiring urgent repair and Veolia understands road repairs are scheduled to commence shortly. In the interest of public safety Veolia customers have been asked to limit travel between Bungendore and Tarago prior to daylight hours.
21/07/2021	6:30:00 am	11436	EPA Environmental Line		Odour	Letter	Lake Bathurst	The EPA received calls to its Environment Line from residents in the Lower Boro, Lake Bathurst and Tarago areas who are complaining about an odour. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	2 hours 20 mins	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
20/07/2021	6:47:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Lower Boro, Lake Bathurst and Tarago areas who are complaining about an odour. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
16/07/2021	5:30:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Lower Boro, Lake Bathurst and Tarago areas who are complaining about an odour. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	3 hours	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.

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Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
15/07/2021	9:00:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Lower Boro, Lake Bathurst and Tarago areas who are complaining about an odour. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	30 mins	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
14/07/2021	4:00:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Tarago area reporting an odour generally described as being offensive with a strong sulphur-like, rotting garbage smell, and grassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
14/07/2021	5:30:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Lower Boro, Lake Bathurst and Tarago areas who are complaining about an odour. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
14/07/2021	5:30:00 am	11436	EPA Environmental Line		Odour	Letter	Lower Boro	The EPA received calls to its Environment Line from residents in the Lower Boro, Lake Bathurst and Tarago areas who are complaining about an odour. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	12 hours	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
13/07/2021	8:00:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Tarago area reporting an odour generally described as being offensive with a strong sulphur-like, rotting garbage smell, and grassy.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
13/07/2021	6:18:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Tarago, and Lower Boro areas who are complaining about an odour. They have generally described the odour as being offensive or very unpleasant with a rotting garbage and grassy smell.	Not Specified	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management. Veolia has recently commissioned an additional booster and flare with a second main gas coming online shortly, as well as the undertaking of two concurrent operational studies.
13/07/2021	10:30:00 am	11436	EPA Environmental Line	EPA-1204	Odour	Letter	Tarago Public School	The staff at the Tarago School have continued odour logging in the last month and have reported the above results to the EPA. The odour is generally described as a rotten egg smell.	Not Specified	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management. Veolia has recently commissioned an additional booster and flare with a second main gas coming online shortly, as well as the undertaking of two concurrent operational studies.
12/07/2021	10:00:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Tarago, and Lower Boro areas who are complaining about an odour. They have generally described the odour as being offensive or very unpleasant with a rotting garbage and grassy smell.	1 hour	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management. Veolia has recently commissioned an additional booster and flare with a second main gas coming online shortly, as well as the undertaking of two concurrent operational studies.
12/07/2021	5:30:00 am	11436	EPA Environmental Line		Odour	Letter	Lower Boro	The EPA received calls to its Environment Line from residents in the Tarago, and Lower Boro areas who are complaining about an odour. They have generally described the odour as being offensive or very unpleasant with a rotting garbage and grassy smell.	10 hours	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management. Veolia has recently commissioned an additional booster and flare with a second main gas coming online shortly, as well as the undertaking of two concurrent operational studies.
12/07/2021	8:21:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents in the Tarago, and Lower Boro areas who are complaining about an odour. They have generally described the odour as being offensive or very unpleasant with a rotting garbage and grassy smell.	Not Specified	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management. Veolia has recently commissioned an additional booster and flare with a second main gas coming online shortly, as well as the undertaking of two concurrent operational studies.
12/07/2021	9:30:00 am	11436	EPA Environmental Line	EPA-1204	Odour	Letter	Tarago Public School	The staff at the Tarago School have continued odour logging in the last month and have reported the above results to the EPA. The odour is generally described as a rotten egg smell.	Not Specified	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management. Veolia has recently commissioned an additional booster and flare with a second main gas coming online shortly, as well as the undertaking of two concurrent operational studies.

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Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
12/07/2021	12:36:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA has received calls to its Environment Line from residents in the Tarago, and Currawang areas who are complaining about an odour. The complainant generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell and gassy.	Not Specified	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management. Veolia has recently commissioned an additional booster and flare with a second main gas coming online shortly, as well as the undertaking of two concurrent operational studies.
11/07/2021	8:00:00 am	11436	EPA Environmental Line		Odour	Letter	Currawang	The EPA has received calls to its Environment Line from residents in the Tarago, and Currawang areas who are complaining about an odour. The complainant generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell and gassy.	1hr 15mins	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management. Veolia has recently commissioned an additional booster and flare with a second main gas coming online shortly, as well as the undertaking of two concurrent operational studies.
10/07/2021	10:00:00 am	11436	EPA Environmental Line		Odour	Letter	Currawang	The EPA has received calls to its Environment Line from residents in the Tarago, and Currawang areas who are complaining about an odour. The complainant generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell and gassy.	8 hours	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management. Veolia has recently commissioned an additional booster and flare with a second main gas coming online shortly, as well as the undertaking of two concurrent operational studies.
07/07/2021	5:30:00 am	11436	EPA Environmental Line	EPA-2065	Odour	Letter	Boro Road, Lower Boro	The complainant reported that the odour had character descriptors of rotten eggs or sulfide, faecal, manure, sewer, and compost (rotten garbage smell), which remained at their property for 3 hours after the odour incident started.	3 hours	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management. Veolia has recently commissioned an additional booster and flare with a second main gas coming online shortly, as well as the undertaking of two concurrent operational studies.
07/07/2021	7:43:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA has received calls to its Environment Line from residents in the Tarago, and Currawang areas who are complaining about an odour. The complainant generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell and gassy.	Not Specified	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management. Veolia has recently commissioned an additional booster and flare with a second main gas coming online shortly, as well as the undertaking of two concurrent operational studies.
05/07/2021	6:09:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainants generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	Not Specified	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management. Veolia has recently commissioned an additional booster and flare with a second main gas coming online shortly, as well as the undertaking of two concurrent operational studies.
04/07/2021	4:04:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA has received calls to its Environment Line from residents in the Tarago, and Currawang areas who are complaining about an odour. The complainant generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell and gassy.	Not Specified	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management. Veolia has recently commissioned an additional booster and flare with a second main gas coming online shortly, as well as the undertaking of two concurrent operational studies.
02/07/2021	7:15:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainants generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	Not Specified	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management. Veolia has recently commissioned an additional booster and flare with a second main gas coming online shortly, as well as the undertaking of two concurrent operational studies.
02/07/2021	6:00:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainants generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	Not Specified	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management. Veolia has recently commissioned an additional booster and flare with a second main gas coming online shortly, as well as the undertaking of two concurrent operational studies.
01/07/2021	11:00:00 am	11436	EPA Environmental Line		Odour	Letter	Lower Boro	The complainants generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	Not Specified	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management. Veolia has recently commissioned an additional booster and flare with a second main gas coming online shortly, as well as the undertaking of two concurrent operational studies.

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Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
01/07/2021	11:00:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainants generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	Not Specified	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management. Veolia has recently commissioned an additional booster and flare with a second main gas coming online shortly, as well as the undertaking of two concurrent operational studies.
01/07/2021	10:22:00 am	11436	Community Feedback Line		Odour	Letter	Mount Fairy Road, Mount Fairy	The complainant reported that they could smell a bitter gassy smell, similar to sulfur halfway down Mount Fairy. They advised it wasn't noticeable at 9am.	Not Specified	It was explained to the complainant that Veolia had recently commissioned an additional booster and flare with a second main gas coming online shortly, as well as the undertaking of two concurrent operational studies.
30/06/2021	8:00:00 am	11436	EPA Environmental Line	EPA-1864	Odour	Letter	Taylors Creek Road, Tarago	The complainant reported a strong odour at their property from 8:00am on 30/06/2021. They advised that the odour was strong, rating it a 4 out of 6 and has been affecting them at home most days for the past month. There was no wind present at the time of the incident.	Not Specifed	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management. Veolia has recently commissioned an additional booster and flare with a second main gas coming online shortly, as well as the undertaking of two concurrent operational studies.
29/06/2021	6:30:00 pm		EPA Environmental Line		Odour	Letter	Collector	The complainants generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	Not Specified	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management. Veolia has recently commissioned an additional booster and flare with a second main gas coming online shortly, as well as the undertaking of two concurrent operational studies.
25/06/2021	7:30:00 am	11436	Community Feedback Line		Odour	Letter	Mount Fairy Road, Mount Fairy	The complainant reported that they had detected an odour over the past months that they initially thought to be their septic system but have realised it appears to be coming from the Bioreactor. They described the smell to be like old rubbish and sewerage.	Not Specified	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management at the premises, the majority of which have already been implemented.
23/06/2021	8:35:00 am	11436	EPA Environmental Line		Odour	Letter	Mount Fairy	The complainant contacted the EPA's Environment Line to complain about an odour allegedly coming from the Bioreactor. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	27 hours	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management at the premises, the majority of which have already been implemented.
23/06/2021	1:46:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant contacted the EPA's Environment Line to complain about an odour allegedly coming from the Bioreactor. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	Not Specified	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management at the premises, the majority of which have already been implemented.
22/06/2021	7:00:00 am	11436	Community Feedback Line		Odour	Letter	Taylors Creek Road, Tarago	The complainant reported that they had noticed an odour allegedly coming from the Bioreactor at approximately 8am.	Not Specified	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management at the premises, the majority of which have already been implemented.
21/06/2021	8:00:00 am	11436	EPA Environmental Line	EPA-1848	Odour	Letter	Currawang	The complainant generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
21/06/2021	8:30:00 am	11436	EPA Environmental Line		Odour	Letter	Collector	The complainant contacted the EPA's Environment Line to complain about an odour allegedly coming from the Bioreactor. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	Not Specified	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management at the premises, the majority of which have already been implemented.
20/06/2021	1:00:00 pm	11436	EPA Environmental Line		Odour	Letter	Currawang	The complainant contacted the EPA's Environment Line to complain about an odour allegedly coming from the Bioreactor. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	6 hours	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management at the premises, the majority of which have already been implemented.
19/06/2021	9:00:00 am	11436	EPA Environmental Line		Odour	Letter	Lake Bathurst	The complainant contacted the EPA's Environment Line to complain about an odour allegedly coming from the Bioreactor. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	2 hours	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management at the premises, the majority of which have already been implemented.
19/06/2021	1:00:00 pm	11436	EPA Environmental Line		Odour	Letter	Lake Bathurst	The complainant contacted the EPA's Environment Line to complain about an odour allegedly coming from the Bioreactor. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	5 hours	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management at the premises, the majority of which have already been implemented.

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Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
18/06/2021	9:02:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA has received calls to its Environment Line from residents in the Tarago, and Currawang areas who are complaining about an odour. The complainant generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell and gassy.	Not Specified	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management. Veolia has recently commissioned an additional booster and flare with a second main gas coming online shortly, as well as the undertaking of two concurrent operational studies.
18/06/2021	8:00:00 am	11436	EPA Environmental Line		Odour	Letter	Lake Bathurst	The complainant contacted the EPA's Environment Line to complain about an odour allegedly coming from the Bioreactor. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	1 hour	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management at the premises, the majority of which have already been implemented.
18/06/2021	8:00:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant contacted the EPA's Environment Line to complain about an odour allegedly coming from the Bioreactor. They generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	2 ½ hours	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management at the premises, the majority of which have already been implemented.
18/06/2021	9:00:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant contacted the EPA's Environment Line to complain about an odour allegedly coming from the Bioreactor. They generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	Not Specified	
16/06/2021	8:45:00 am	11436	EPA Environmental Line	EPA-1204	Odour	Letter	Tarago Public School	The staff at the Tarago School have continued odour logging in the last month and have reported the above results to the EPA. The odour is generally described as a rotten egg smell.	Not Specified	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management. Veolia has recently commissioned an additional booster and flare with a second main gas coming online shortly, as well as the undertaking of two concurrent operational studies.
16/06/2021	7:00:00 am	11436	EPA Environmental Line		Odour	Letter	Lake Bathurst	The complainant contacted the EPA's Environment Line to complain about an odour allegedly coming from the Bioreactor. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	1 hour	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management at the premises, the majority of which have already been implemented.
16/06/2021	5:50:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant contacted the EPA's Environment Line to complain about an odour allegedly coming from the Bioreactor. They generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	Not Specified	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management at the premises, the majority of which have already been implemented.
16/06/2021	6:45:00 am	11436	EPA Environmental Line		Odour	Letter	Lake Bathurst	The complainant contacted the EPA's Environment Line to complain about an odour allegedly coming from the Bioreactor. They generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	Not Specified	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management at the premises, the majority of which have already been implemented.
16/06/2021	7:15:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant contacted the EPA's Environment Line to complain about an odour allegedly coming from the Bioreactor. They generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	Not Specified	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management at the premises, the majority of which have already been implemented.
15/06/2021	7:00:00 am	11436	EPA Environmental Line		Odour	Letter	Lake Bathurst	The complainant contacted the EPA's Environment Line to complain about an odour allegedly coming from the Bioreactor. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	2 hours	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management at the premises, the majority of which have already been implemented.
15/06/2021	8:30:00 am	11436	EPA Environmental Line		Odour	Letter	Currawang	The complainant contacted the EPA's Environment Line to complain about an odour allegedly coming from the Bioreactor. They generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	1 ½ hours	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management at the premises, the majority of which have already been implemented.
15/06/2021	6:30:00 am	11436	EPA Environmental Line		Odour	Letter	Currawang	The complainant contacted the EPA's Environment Line to complain about an odour allegedly coming from the Bioreactor. They generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	2 hours	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management at the premises, the majority of which have already been implemented.
15/06/2021	7:45:00 am	11436	EPA Environmental Line		Odour	Letter	Currawang	The complainant contacted the EPA's Environment Line to complain about an odour allegedly coming from the Bioreactor. They generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	5 hours 15 mins	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management at the premises, the majority of which have already been implemented.
15/06/2021	8:50:00 am	11436	Community Feedback Line		Odour	Letter	King Street, Tarago	The complainant contacted the Veolia community line to report an odour allegedly coming from the Bioreactor. She was unable to describe the smell exactly but said it was most evident on very still mornings. The smell was also evident on 14/06 at 7am.	1 hour	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management at the premises, the majority of which have already been implemented.

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Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
14/06/2021	10:30:00 am	11436	EPA Environmental Line		Odour	Letter	Lake Bathurst	The complainant contacted the EPA's Environment Line to complain about an odour allegedly coming from the Bioreactor. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	2 hours	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management at the premises, the majority of which have already been implemented.
13/06/2021	5:36:00 pm	11436	EPA Environmental Line	EPA-1589	Odour	Letter	Cullulla Road, Tarago	The complainant reported a strong odour at their property from 5:36pm. They advised that the breeze was a slight westerly and the odour was a very unpleasant garbage smell that resembled leachate.	1 hour	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management at the premises, the majority of which have already been implemented.
11/06/2021	8:30:00 am	11436	EPA Environmental Line	EPA-1204	Odour	Letter	Tarago Public School	The staff at the Tarago School have continued odour logging in the last month and have reported the above results to the EPA. The odour is generally described as a rotten egg smell.	Not Specified	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management. Veolia has recently commissioned an additional booster and flare with a second main gas coming online shortly, as well as the undertaking of two concurrent operational studies.
11/06/2021	9:00:00 am	11436	EPA Environmental Line	EPA-1587	Odour	Letter	Braidwood Road, Lake Bathurst	The complainant reported noticing a smell at the back of their property from 9am to 2pm. They mentioned that the odour was very bad 3 weeks ago, then it subsided in the village for a while, and it is the first time this week that they have smelt the odour at their property. The weather was very cold, a light breeze from the west 16kph and slight rain.	5 hours	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management at the premises, the majority of which have already been implemented.
11/06/2021	9:00:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents of Tarago who were complaining about an odour coming from the Woodlawn Bioreactor. The complainants have generally described the odour as being offensive with a strong odour rotting garbage smell.	Not Specified	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management at the premises, the majority of which have already been implemented.
09/06/2021	8:15:00 am	11436	EPA Environmental Line	EPA-1204	Odour	Letter	Tarago Public School	The staff at the Tarago School have continued odour logging in the last month and have reported the above results to the EPA. The odour is generally described as a rotten egg smell.	Not Specified	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management. Veolia has recently commissioned an additional booster and flare with a second main gas coming online shortly, as well as the undertaking of two concurrent operational studies.
09/06/2021	9:11:00 am	11436	Community Feedback Line		Odour	Letter	King Street, Tarago	The complainant advised that there was a distinct smell of rotten eggs or H2S in the air at the time of the call. They advised that they were disappointed at the smell recently emitting from the Bioreactor that they believe is the worst they've experienced in the 14 years.	Not Specified	Veolia management attended the complainants address to help identify the odour and discuss improvements Veolia are implementing in collaboration with the EPA to help reduce odour emissions from the site.
08/06/2021	6:15:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received calls to its Environment Line from residents of Tarago who were complaining about an odour coming from the Woodlawn Bioreactor. The complainants have generally described the odour as being offensive with a strong odour rotting garbage smell.	2 hours	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management at the premises, the majority of which have already been implemented.
07/06/2021	7:50:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received numerous calls to its Environment Line from residents in the Lower Boro, Currawang, and Tarago area complaining about an odour. These callers have generally described the odour as being offensive, smelling like rotten garbage and rotten eggs.	Not Specified	Veolia is currently in consultation with the EPA in relation to implementing additional air emissions monitoring measures and have already identified and are progressively acting upon a series of operational improvements.
05/06/2021	9:30:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The EPA received numerous calls to its Environment Line from residents in the Lower Boro, Currawang, and Tarago area complaining about an odour. These callers have generally described the odour as being offensive, smelling like rotten garbage and rotten eggs.	Not Specified	Veolia is currently in consultation with the EPA in relation to implementing additional air emissions monitoring measures and have already identified and are progressively acting upon a series of operational improvements.
03/06/2021	3:00:00 pm	11436	EPA Environmental Line		Odour	Letter	Currawang	The EPA received numerous calls to its Environment Line from residents in the Lower Boro, Currawang, and Tarago area complaining about an odour. These callers have generally described the odour as being offensive, smelling like rotten garbage and rotten eggs.	4 hours	Veolia is currently in consultation with the EPA in relation to implementing additional air emissions monitoring measures and have already identified and are progressively acting upon a series of operational improvements.
03/06/2021	10:00:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainants generally described the odour odour as being offensive, and unpleasant.	Not Specified	Veolia is currently in consultation with the EPA in relation to implementing additional air emissions monitoring measures and have already identified and are progressively acting upon a series of operational improvements.

Woodlawn Bioreactor Complaints Register

Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
03/06/2021	11:00:00 pm	11436	EPA Environmental Line	EPA-1463	Odour	Letter	Bungendore	The complainant generally described the odour as being offensive and invasive to their daily activities.	Not Specified	Veolia is currently in consultation with the EPA in relation to implementing additional air emissions monitoring measures and have already identified and are progressively acting upon a series of operational improvements.
03/06/2021	5:00:00 pm	11436	E-mail		Odour	Letter	Federal Highway, Collector	The complainant has reported a landfill odour detected by himself and other EPA officers at approximately 5:00pm yesterday (03/06) on the Federal Highway near Collector.	Not Specified	Veolia is currently in consultation with the EPA in relation to implementing additional air emissions monitoring measures and have already identified and are progressively acting upon a series of operational improvements.
03/06/2021	6:00:00 am	11436	Community Feedback Line		Odour	Letter	Mt Fairy	The complainant reported detecting a constant 'off rubbish' smell that has been occurring for months mostly in the mornings.	Not Specified	Veolia is currently in consultation with the EPA in relation to implementing additional air emissions monitoring measures and have already identified and are progressively acting upon a series of operational improvements.
02/06/2021	6:30:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainants generally described the odour odour as being offensive, and unpleasant.	Not Specified	Veolia is currently in consultation with the EPA in relation to implementing additional air emissions monitoring measures and have already identified and are progressively acting upon a series of operational improvements.
02/06/2021	6:36:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant has reported an odour generally described as being 'very unpleasant garbage gassy odour'.	Not Specified	Veolia is currently in consultation with the EPA in relation to implementing additional air emissions monitoring measures and have already identified and are progressively acting upon a series of operational improvements.
02/06/2021	8:30:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago Public School	The complainant has commenced odour logging in the last week and has reported results to the EPA. The odour is generally described as a rotten egg or rubbish smell with a strength from 2-4.	Not Specified	Veolia is currently in consultation with the EPA in relation to implementing additional air emissions monitoring measures and have already identified and are progressively acting upon a series of operational improvements.
01/06/2021	7:55:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainants generally described the odour odour as being offensive, and unpleasant.	Not Specified	Veolia is currently in consultation with the EPA in relation to implementing additional air emissions monitoring measures and have already identified and are progressively acting upon a series of operational improvements.
01/06/2021	10:30:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago Public School	The complainant has commenced odour logging in the last week and has reported results to the EPA. The odour is generally described as a rotten egg or rubbish smell with a strength from 2-4.	Not Specified	Veolia is currently in consultation with the EPA in relation to implementing additional air emissions monitoring measures and have already identified and are progressively acting upon a series of operational improvements.
01/06/2021	9:00:00 am	11436	EPA Environmental Line	EPA-1336	Odour	Letter	King Street, Tarago	The complainant reported a "rotten egg smell" occurring that morning within the caller's home and rating the odour strength as a 5/6 .	Not Specified	Veolia is currently in consultation with the EPA in relation to implementing additional air emissions monitoring measures and have already identified and are progressively acting upon a series of operational improvements.
01/06/2021	12:00:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant has alleged an odour is coming from Woodlawn Bioreactor and has generally described the odour as being offensive and rated 5/6.	18 hours	Veolia is currently in consultation with the EPA in relation to implementing additional air emissions monitoring measures and have already identified and are progressively acting upon a series of operational improvements.
01/06/2021	10:00:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant has alleged an odour is coming from Woodlawn Bioreactor and has generally described the odour as being offensive.	Not Specifed	Veolia is currently in consultation with the EPA in relation to implementing additional air emissions monitoring measures and have already identified and are progressively acting upon a series of operational improvements.
01/06/2021	11:00:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant has alleged an odour is coming from Woodlawn Bioreactor and has generally described the odour as being offensive.	Not Specifed	Veolia is currently in consultation with the EPA in relation to implementing additional air emissions monitoring measures and have already identified and are progressively acting upon a series of operational improvements.
01/06/2021	5:00:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant has alleged an odour is coming from Woodlawn Bioreactor and has generally described the odour as being offensive, rotten-egg-like, and smelling like sulfate.	Not Specifed	Veolia is currently in consultation with the EPA in relation to implementing additional air emissions monitoring measures and have already identified and are progressively acting upon a series of operational improvements.
31/05/2021	8:15:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant has alleged an odour is coming from Woodlawn Bioreactor and has generally described the odour as being offensive, rotten-egg-like, and smelling like sulfate.	Not Specifed	Veolia is currently in consultation with the EPA in relation to implementing additional air emissions monitoring measures and have already identified and are progressively acting upon a series of operational improvements.
31/05/2021	10:00:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant has alleged an odour is coming from Woodlawn Bioreactor and has generally described the odour as being offensive, rotten-egg-like, and smelling like sulfate.	Not Specifed	Veolia is currently in consultation with the EPA in relation to implementing additional air emissions monitoring measures and have already identified and are progressively acting upon a series of operational improvements.

Woodlawn Bioreactor Complaints Register

Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
30/05/2021	9:00:00 am	11436	EPA Environmental Line	EPA-1766	Odour	Letter	Lake Bathurst	The complainant contacted the EPA's Environment Line to complain about an odour allegedly coming from the Bioreactor. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	3 hours	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management at the premises, the majority of which have already been implemented.
29/05/2021	10:00:00 pm	11436	EPA Environmental Line	EPA-1766	Odour	Letter	Lake Bathurst	The complainant contacted the EPA's Environment Line to complain about an odour allegedly coming from the Bioreactor. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	3 hours	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management at the premises, the majority of which have already been implemented.
27/05/2021	7:10:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago Public School	The complainant has commenced odour logging in the last week and has reported results to the EPA. The odour is generally described as a rotten egg or rubbish smell with a strength from 2-4.	Not Specified	Veolia is currently in consultation with the EPA in relation to implementing additional air emissions monitoring measures and have already identified and are progressively acting upon a series of operational improvements.
26/05/2021	9:00:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago Public School	The complainant has commenced odour logging in the last week and has reported results to the EPA. The odour is generally described as a rotten egg or rubbish smell with a strength from 2-4.	Not Specified	Veolia is currently in consultation with the EPA in relation to implementing additional air emissions monitoring measures and have already identified and are progressively acting upon a series of operational improvements.
23/05/2021	7:00:00 am	11436	EPA Environmental Line		Odour	Letter	Currawang	The EPA received numerous calls to its Environment Line from residents in the Lower Boro, Currawang, and Tarago area complaining about an odour. These callers have generally described the odour as being offensive, smelling like rotten garbage and rotten eggs.	2 ½ hours	Veolia is currently in consultation with the EPA in relation to implementing additional air emissions monitoring measures and have already identified and are progressively acting upon a series of operational improvements.
22/05/2021	6:00:00 am	11436	EPA Environmental Line	EPA-1766	Odour	Letter	Lake Bathurst	The complainant contacted the EPA's Environment Line to complain about an odour allegedly coming from the Bioreactor. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	3 hours	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management at the premises, the majority of which have already been implemented.
22/05/2021	7:00:00 am	11436	EPA Environmental Line		Odour	Letter	Currawang	The EPA received numerous calls to its Environment Line from residents in the Lower Boro, Currawang, and Tarago area complaining about an odour. These callers have generally described the odour as being offensive, smelling like rotten garbage and rotten eggs.	2 hours	Veolia is currently in consultation with the EPA in relation to implementing additional air emissions monitoring measures and have already identified and are progressively acting upon a series of operational improvements.
22/05/2021	6:40:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant has alleged an odour is emitting from Woodlawn Bioreactor and have generally described the odour as offensive, rotting garbage, and sewerage-like.	4 hours 20 mins	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
22/05/2021	6:30:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant has alleged an odour is emitting from Woodlawn Bioreactor and have generally described the odour as offensive, rotting garbage, and sewerage-like.	Not Specifed	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
22/05/2021	7:15:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant has alleged an odour is emitting from Woodlawn Bioreactor and have generally described the odour as offensive, rotting garbage, and sewerage-like.	Not Specifed	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.

Woodlawn Bioreactor Complaints Register

Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
21/05/2021	3:52:00 am	11436	Community Feedback Line		Odour	Letter	Taylors Creek Road, Tarago	The complainant reported they were able to smell an odour allegedly coming from the Bioreactor since arriving at home 20mins ago.	Not Specifed	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
20/05/2021	5:00:00 am	11436	E-mail		Odour	Letter	Marked Tree Road, Gundaroo	The complainant reported that during last week, they have again experienced offensive odours emanating from the Bioreactor.		Veolia is currently in consultation with the EPA in relation to implementing additional air emissions monitoring measures and have already identified and are progressively acting upon a series of operational improvements.
20/05/2021	8:10:00 am	11436	EPA Environmental Line	EPA-1204	Odour	Letter	Tarago Public School	The complainant reported a sharp strong smell" upon arrival at the school at 8:10am during still conditions which had transitioned to "a gassy egg smell" once the breeze had picked up and at the time of the call which was made at 9:00am.	1 hour	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
20/05/2021	7:00:00 am	11436	EPA Environmental Line	EPA-1203	Odour	Letter	Tarago Village	The complainant reported a "rotting waste odour" occurring the night prior at 10:00pm within the caller's home and again the morning of the complaint at 7:00am when the caller visited Tarago village.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
19/05/2021	2:00:00 am	11436	E-mail		Odour	Letter	Marked Tree Road, Gundaroo	The complainant reported that during last week, they have again experienced offensive odours emanating from the Bioreactor.		Veolia is currently in consultation with the EPA in relation to implementing additional air emissions monitoring measures and have already identified and are progressively acting upon a series of operational improvements.
19/05/2021	10:00:00 pm	11436	EPA Environmental Line	EPA-1203	Odour	Letter	Braidwood Road, Tarago	The complainant reported a "rotting waste odour" occurring the night prior at 10:00pm within the caller's home and again the morning of the complaint at 7:00am when the caller visited Tarago village.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
18/05/2021	8:15:00 am	11436	EPA Environmental Line		Odour	Letter	Lower Boro	The EPA received numerous calls to its Environment Line from residents in the Lower Boro, Currawang, and Tarago area complaining about an odour. These callers have generally described the odour as being offensive, smelling like rotten garbage and rotten eggs.	3 hours	Veolia is currently in consultation with the EPA in relation to implementing additional air emissions monitoring measures and have already identified and are progressively acting upon a series of operational improvements.
18/05/2021	10:30:00 am	11436	Community Feedback Line	VEO-004	Odour	Letter	Mayfield Road, Tarago	The complainant reported smelling a sickly odour that turns their stomach. They advised they were unable to hang out their washing due to the smell which was the worst that they've ever smelt.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
18/05/2021	9:00:00 am	11436	Community Feedback Line	VEO-002	Odour	Letter	King Street, Tarago	The complainant reported that a disgusting odour of rank milk was smelt in Tarago. They advised that it was slightly different from other times. They stated that It was a beautiful, still, foggy morning and they were unable to enjoy the country morning outside due to the horrible smell in the air that made her want to vomit. They have lived in Tarago for 12 years and were disappointed in how bad the odour has become recently.	Not Specified	A Veolia staff member was in Tarago immediately following the report and was unable to detect any odour. Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.

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Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
18/05/2021	7:00:00 pm	11436	EPA Environmental Line		Odour	Letter	Lower Boro	The complainant reported an odour generally described as being offensive, rotten-egg like, and smelling like sulfate.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
18/05/2021	7:10:00 am	11436	EPA Environmental Line		Odour	Letter	Mt Fairy	The complainant reported an odour generally described as being offensive, rotten-egg like, and smelling like sulfate.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
18/05/2021	6:30:00 am	11436	EPA Environmental Line		Odour	Letter	Not Specified	The complainant reported an odour generally described as being offensive, rotten-egg like, and smelling like sulfate.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
18/05/2021	5:30:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant reported an odour generally described as being offensive, rotten-egg like, and smelling like sulfate.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
18/05/2021	7:00:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant reported an odour generally described as being offensive, rotten-egg like, and smelling like sulfate.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
18/05/2021	9:40:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant reported an odour generally described as being offensive, rotten-egg like, and smelling like sulfate.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
18/05/2021	8:45:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant reported an odour generally described as being offensive, rotten-egg like, and smelling like sulfate.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
18/05/2021	9:00:00 am	11436	Community Feedback Line	VEO-003	Odour	Letter	Tarago	The complainant reported that an odour was smelt in Tarago this morning and on the last Sunday morning.	Not Specified	A Veolia staff member was in Tarago immediately following the report and was unable to detect any odour. Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
17/05/2021	4:30:00 pm	11436	EPA Environmental Line		Odour	Letter	Not Specified	The complainant reported an odour generally described as being offensive, rotten-egg like, and smelling like sulfate.	Not Specified	Due to the lack of information provided in relation to the complainants location, we are unable to properly investigate this report of odour.
16/05/2021	9:00:00 pm	11436	E-mail		Odour	Letter	Marked Tree Road, Gundaroo	The complainant reported that during last week, they have again experienced offensive odours emanating from the Bioreactor.		Veolia is currently in consultation with the EPA in relation to implementing additional air emissions monitoring measures and have already identified and are progressively acting upon a series of operational improvements.
16/05/2021	9:00:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant alleged an offensive odour is emitting from Woodlawn Bioreactor.	Not Specifed	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
14/05/2021	11:20:00 pm	11436	EPA Environmental Line		Odour	Letter	Not Specified	The complainant reported an odour generally described as being offensive, rotten-egg like, and smelling like sulfate.	Not Specified	Due to the lack of information provided in relation to the complainants location, we are unable to properly investigate this report of odour.
13/05/2021	7:00:00 am	11436	EPA Environmental Line		Odour	Letter	Mount Fairy	The complainant reported an odour as being offensive, rotten-egg like, and smelling like sulfate.	Approx 3 hours	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.

Woodlawn Bioreactor Complaints Register

Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
13/05/2021	8:45:00 am	11436	EPA Environmental Line		Odour	Letter	Oallen	The complainant reported an odour as being offensive, rotten-egg like, and smelling like sulfate.	Approx 1 hour	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
13/05/2021	7:00:00 am	11436	EPA Environmental Line	EPA-926	Odour	Letter	Roseberry Street, Tarago	The complainant reported an extremely strong rotten garbage odour starting around 7:00am that morning. The reporter would rate the odour 8/10. The smell was still at her property when she left for work at 8:30am. In the past she would only notice the smell 4 times per year, since April it is there 3 times per week and is stronger.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
13/05/2021	6:00:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant reported an odour generally described as offensive, rotten-egg like, and smelling like dead animals.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
13/05/2021	7:34:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant reported an odour as being offensive, rotten-egg like, and smelling like sulfate.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
13/05/2021	4:30:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant reported an odour as being offensive, rotten-egg like, and smelling like sulfate.	Approx 3 hours	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
13/05/2021	6:30:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant reported an odour as being offensive, rotten-egg like, and smelling like sulfate.	2 ½ hours	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
13/05/2021	7:25:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant reported an odour as being offensive, rotten-egg like, and smelling like sulfate.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
13/05/2021	6:30:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant reported an odour as being offensive, rotten-egg like, and smelling like sulfate.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
13/05/2021	8:30:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant reported an odour as being offensive, rotten-egg like, and smelling like sulfate.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
13/05/2021	6:30:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant has generally described the odour as being offensive, rotten-egg like, and smelling like sulfate.	2 1/2 hours	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
12/05/2021	6:00:00 am	11436	EPA Environmental Line		Odour	Letter	Currawang	The complainant reported an odour generally described as offensive, rotten-egg like, and smelling like dead animals.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
12/05/2021	7:00:00 am	11436	EPA Environmental Line		Odour	Letter	Currawang	The complainant has generally described the odour as being offensive, rotten-egg like, and smelling like sulfate.	1 1/2 hours	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.

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Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
12/05/2021	3:00:00 am	11436	EPA Environmental Line	EPA-924	Odour	Letter	Goulburn Street, Tarago	The complainant reported a strong odour at her property. The odour was hard to describe, a bit like sewage/rotten eggs. The odour was particularly strong at around 3am, infiltrating the house despite closed doors and windows, and it was an overpowering smell outside. The smell was still present when the reporter got up at 7:00am, then again when they got home from work at 6:00pm. No wind was noticed.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
11/05/2021	10:00:00 am	11436	Phone (Direct)	VEO-001	Odour	Letter	Willow Glen Road, Tarago	The complaint reported that upon return from being away out of town, an odour was evident on Friday night that continued throughout the weekend. They also advised they could smell the Bioreactor this morning as well.	Not Specified	Site Management attempted to contact the complainant for more information following the receipt of the complaint via voicemail however was unable to reach them. Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
11/05/2021	7:36:00 am	11436	EPA Environmental Line	EPA-900	Odour	Letter	Cnr Mayfield Road and Lumley Road	The complainant reported that the smell of rotten eggs was experienced when he was driving past the corner of Mayfield Road and Lumley Road, Tarago. He rated the smell 10/10 and said it made his wife 'gag'. The smell was not as bad at their place of residence. He has lived on Hilltop Road for 2 years, and reports that the smell has become more regular over the last few months - several times per week, particularly during times when there was no wind. It was a similar smell experienced when standing above the bioreactor on Veolia's open day.	Various	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
11/05/2021	10:00:00 am	11436	EPA Environmental Line		Odour	Letter	Lake Bathurst	The complainant reported an odour as being offensive, rotten-egg like, and smelling like sulfate.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
11/05/2021	7:12:00 am	11436	EPA Environmental Line	EPA-878	Odour	Letter	Lime Street, Tarago	The complainant reported 'an awful odour' at their property. They said that they did not want to open the front door as they were concerned that the smell would travel through the house. The complainant stated that over the last few months the odour has become worse and more frequent.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
11/05/2021	5:50:00 am	11436	EPA Environmental Line		Odour	Letter	Lower Boro	The complainant has generally described the odour as being offensive, rotten-egg like, and smelling like sulfate.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
11/05/2021	7:00:00 pm	11436	EPA Environmental Line	EPA-935	Odour	Letter	Mulwaree Street, Tarago	The complainant reported a "gaseous, rotten garbage smell" coming through the doors of the home. The complainant first noted the smell at around 7:00pm and it was still present at the time of the report which was made at 9:26pm. The complainant alleged that the odour was coming from the Woodlawn Bioreactor.	2 1/2 hours	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
11/05/2021	7:00:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant reported an odour as being offensive, rotten-egg like, and smelling like sulfate.	Approx 7 hours	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
11/05/2021	9:00:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant reported an odour as being offensive, rotten-egg like, and smelling like sulfate.	Approx 1 hour	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.

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Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
10/05/2021	5:40:00 am	11436	Phone (Direct)		Odour	Letter	Mayfield Road, Tarago	The complainant stated that the odour was pretty bad this morning and felt that someone needed to know.	Not Specified	It was explained to the complainant that several improvement projects are currently underway to reduce odour and that a report would be submitted to the EPA based on the information being provided. Site Management drove to the complainants location shortly following the time of the call, and was unable to detect any odour.
10/05/2021	6:00:00 am	11436	EPA Environmental Line	EPA-879	Odour	Letter	Hilltop Close, Tarago	The complainant reported a smell of sulphur when they walked outside of their house. There was a light breeze when the odour was present.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
10/05/2021	7:10:00 am	11436	EPA Environmental Line		Odour	Letter	Mt Fairy	The complainant has generally described the odour as being offensive, rotten-egg like, and smelling like sulfate.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
10/05/2021	4:55:00 pm	11436	EPA Environmental Line	EPA-908	Odour	Letter	Mulwaree Street, Tarago	The complainant reported a “gaseous, rotten garbage smell”. The complainant stated that the smell has been the worst they have smelt since moving into their residence in 2019. The smell was further reported to have returned at the time of the call and was reported as “overpowering”. The complainant alleged that the odour was coming from the Woodlawn Bioreactor.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
10/05/2021	6:12:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant has generally described the odour as being offensive, rotten-egg like, and smelling like sulfate.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
10/05/2021	6:10:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant has generally described the odour as being offensive, rotten-egg like, and smelling like sulfate.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
09/05/2021	9:44:00 am	11436	Community Feedback Line		Odour	Letter	Glenoval Road, Lake Bathurst	The complainant reported that the odour was very intense at his house (at the time of his call).	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting on Monday 10th May, 2021.

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Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
09/05/2021	8:00:00 am	11436	EPA Environmental Line		Odour	Letter	Lake Bathurst	The complainant has generally described the odour as being offensive, rotten-egg like, and smelling like sulfate.	2 hours	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
09/05/2021	9:30:00 am	11436	EPA Environmental Line		Odour	Letter	Lake Bathurst	The complainant has generally described the odour as being offensive, rotten-egg like, and smelling like sulfate.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
09/05/2021	6:00:00 pm	11436	Community Feedback Line		Odour	Letter	Mayfield Road, Tarago	The complainant reported that they were able to smell the Bioreactor this morning at 7.30am which started at 6pm last night.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting on Monday 10th May, 2021.
09/05/2021	8:30:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant reported an odour as being offensive, rotten-egg like, and smelling like sulfate.	6 1/2 hours	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
09/05/2021	9:00:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant has generally described the odour as being offensive, rotten-egg like, and smelling like sulfate.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
09/05/2021	7:38:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant has generally described the odour as being offensive, rotten-egg like, and smelling like sulfate.	1 hour	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
09/05/2021	7:27:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant has generally described the odour as being offensive, rotten-egg like, and smelling like sulfate.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.

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Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
09/05/2021	9:10:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant has generally described the odour as being offensive, rotten-egg like, and smelling like sulfate.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
08/05/2021	9:50:00 pm	11436	Community Feedback Line		Odour	Letter	Stewart Street, Tarago	The complainant reported that the odour was the worst they've ever experienced with a very very low breeze at the time.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting on Monday 10th May, 2021.
08/05/2021	9:30:00 am	11436	EPA Environmental Line		Odour	Letter	Mt Fairy	The complainant has generally described the odour as being offensive, rotten-egg like, and smelling like sulfate.	5 hours	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
08/05/2021	12:38:00 pm	11436	EPA Environmental Line	EPA-907	Odour	Letter	Roseberry Street, Tarago	The complainant reported frustration with ongoing issues with odours in the localised area that have progressively worsened in recent weeks. The complainant stated that the smell has been at its worst in the mornings when conditions are still, and to a lesser extent during still afternoons. The complainant alleged that the odour was coming from the Woodlawn Bioreactor.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
08/05/2021	3:30:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant has generally described the odour as being offensive, rotten-egg like, and smelling like sulfate.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
08/05/2021	9:00:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant has generally described the odour as being offensive, rotten-egg like, and smelling like sulfate.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
08/05/2021	9:00:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant has generally described the odour as being offensive, rotten-egg like, and smelling like sulfate.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.

Woodlawn Bioreactor Complaints Register

Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
08/05/2021	5:00:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant has generally described the odour as being offensive, rotten-egg like, and smelling like sulfate.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
07/05/2021	6:30:00 pm	11436	EPA Environmental Line		Odour	Letter	Collector	The complainant has generally described the odour as being offensive, rotten-egg like, and smelling like sulfate.	1 ½ hours	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
07/05/2021	10:00:00 am	11436	EPA Environmental Line		Odour	Letter	Currawang	The complainant reported an odour generally described as offensive, rotten-egg like, and smelling like dead animals.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
07/05/2021	12:15:00 pm	11436	EPA Environmental Line		Odour	Letter	Currawang	The complainant has generally described the odour as being offensive, rotten-egg like, and smelling like sulfate.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
07/05/2021	8:00:00 pm	11436	EPA Environmental Line	EPA-840	Odour	Letter	Hilltop Close, Tarago	The complainant reported a very strong odour coming from the Woodlawn Bioreactor. They said they noticed it on 7/05/21 between 8pm and 12am. They said it smells like sulphate.	4 hours	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
07/05/2021	6:40:00 pm	11436	Community Feedback Line		Odour	Letter	Mooneys Road, Currawang	The complainant reported an odour allegedly coming from the Bioreactor was evident at the time of his report. They also queried particulate and drinking water.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting on Monday 10th May, 2021.
07/05/2021	6:00:00 am	11436	Community Feedback Line		Odour	Letter	Mooneys Road, Currawang	The complainant reported having experienced the odour for a few days now. They advised that it smelt like rotting rubbish and egg smell.	2 hours	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting on Monday 10th May, 2021.

Woodlawn Bioreactor Complaints Register

Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
07/05/2021	8:00:00 pm	11436	EPA Environmental Line	EPA-871	Odour	Letter	Rosebery Street, Tarago	The complainant reported a strong overpowering landfill odour coming from Woodlawn Bioreactor at 8pm.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
07/05/2021	9:47:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant has generally described the odour as being offensive, rotten-egg like, and smelling like sulfate.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
07/05/2021	7:00:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant has generally described the odour as being offensive, rotten-egg like, and smelling like sulfate.	3 hours	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
07/05/2021	6:00:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant has generally described the odour as being offensive, rotten-egg like, and smelling like sulfate.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
06/05/2021	2:48:00 pm	11436	EPA Environmental Line		Odour	Letter	Collector	The complainant has generally described the odour as being offensive, rotten-egg like, and smelling like sulfate.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
5/5/2021	06:00:00 am and 07:00:00 am	11436	Community Feedback Line		Odour	Letter	Mooneys Road, Currawang	The complainant reported odour was not as strong, probably due to the wind and rain. Odour was described as a gassy/rubbishy smell.	Not specified	Site Management explained that several improvement projects are currently underway to reduce odour and that a report would be submitted to the EPA based on the information being provided. An odour diary was requested and will be provided to the resident early next week. Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
05/05/2021	8:45:00 am	11436	EPA Environmental Line		Odour	Letter	Currawang	The complainant reported rotten sour garbage type odour they have been experiencing.	All Day	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.

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Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
05/05/2021	7:00:00 am	11436	EPA Environmental Line	EPA-841	Odour	Letter	Mooneys Road, Currawang	The complainant reported that at all day from 7.00am on 5/05/21 and from 6.30am on 07/05/21 they experienced an odour coming from the Woodlawn Bioreactor. They advised that the smell made them want to vomit and gave them asthma. They also said it smells like rotten egg gas.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
4/5/2021	2:00:00 pm	11436	EPA Environmental Line		Odour	Letter	Breadalbane Rd, Collector	The complainant reported the odour smells like rotten eggs, and they rate it as a 5 out of 6 odour strength. The caller identified that at the time of the incident there was no breeze and heavy cloud cover.	2 hours	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
4/5/2021	10:20:00 am	11436	EPA Environmental Line		Odour	Letter	Carney's Road, Currawang	The complainant reported a “strong smell” in the air outside their home that remained in the air for a couple of hours and is typical of the smell that is observed when she drives past the Woodlawn Facility. She said she can regularly smell landfill odours outside their house, but today is the worst it has been in recent history.	2 hours	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
04/05/2021	8:30:00 am	11436	EPA Environmental Line		Odour	Letter	Collector	The complainant has generally described the odour as being offensive, rotten-egg like, and smelling like sulfate.	All Day	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
04/05/2021	5:50:00 pm	11436	EPA Environmental Line	EPA-748	Odour	Letter	Collector Road, Collector	The complainant reported that there was a smell traveling from the Woodlawn Bioreactor. They advised that the wind was coming from the South East direction to callers property.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. An update on the progress and effect of these actions were presented at a TADPAI community meeting that was held on Monday 10th May, 2021.
4/5/2021	Various	11436	EPA Environmental Line		Odour	Letter	Collector Road, Currawang	The complainant reported being affected by “a strong, offensive rotten refuse odour, somewhat like unfinished compost or tip smell”. They said they typically smell the odour in the morning, but unusually for them it was present at the time of their call to Environment Line. They said the weather was rainy and the air was generally still.	Not specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
4/5/2021	Not Specified	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant reported the odour makes them feel unwell and it is of concern to their overall health.	Not specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
3/5/2021	7:30:00 am	11436	EPA Environmental Line		Odour	Letter	Braidwood Road, Tarago	The complainant reported being impacted by “a stench” from the Woodlawn Bioreactor. Complainant advised that he was out in his paddock shifting cattle on his quad bike and almost vomited because of “the stench coming from the bioreactor”. He said the odour was so strong “you could almost cut it with a knife”.	Not specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
3/5/2021	6:36:00 am	11436	EPA Environmental Line		Odour	Letter	Braidwood Road, Tarago	The complainant reported being impacted by a “putrid stench from Veolia Recycling Centre” and they couldn’t open any windows in their house without the odour coming inside. They said it is a regular occurrence at their address.	Not specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
3/5/2021	8:45:00 am	11436	EPA Environmental Line		Odour	Letter	Leahys Lane, Tarago	The complainant reported that they went for a run at 8:45am that morning and were impacted by “an incredibly strong and unpleasant odour of rotting household garbage” allegedly coming from the Woodlawn Bioreactor.	Not specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.

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Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
3/5/2021	Not Specified	11436	E-mail		Odour	Letter	Marked Tree Road, Gundaroo	The complaint reported that periodically, they get bad odours from the bioreactor (smells of rotting putrescible waste), however since January 2021 the frequency and intensity of this problem has increased. It is now occurring 2-4 times per week, often overnight when Easterly breezes push the pollution their way (often with fog at this time of year). The complaint advised that they are extremely concerned about the contents of airborne pollution from the Woodlawn bioreactor and note previous reported concerns about fungal and bacterial elements in airborne pollution associated with odours emanating from the reactor. The release of such pollution is placing all those exposed to it at risk of developing respiratory and other adverse health effects	Not specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting. A response to the complaint is being drafted to address the concerns raised.
3/5/2021	Not Specified	11436	EPA Environmental Line		Odour	Letter	Mays Lane, Currawang	The complainant reported the odour smells like rotten egg, with a thick odour which is detected within cars and houses.	Not specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
3/5/2021	10:28:00 am	11436	EPA Environmental Line		Odour	Letter	Mt Fairy	The complainant reported a smell described as “methane and rotting food”. The complainant had observed the smell in the last few days prior to his call and made observations of the smell as far away as Mount Fairy.	Not specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
3/5/2021	9:02:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant reported a “very strong smell” in the air most mornings for the last week. They said they have been in the area for nearly 5 years and the smell at the time of the call, was the worst they could ever recall smelling.	Not specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
3/5/2021	7:00:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant reported the odour was regarded as an ongoing issue and impacts where they travel.	4 1/2 hours	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
2/5/2021	2:10:00 pm	11436	Community Feedback Line		Odour	Letter	Tarago	The complainant hadn't detected a smell the days prior, even though it was foggy and still.	Not specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
1/5/2021	9:23:00 am	11436	EPA Environmental Line		Odour	Letter	Rosebery Street, Tarago	The complainant reported that for the prior 3 days there has been a “strong tip like smell” in the area but also noted this has been an ongoing issue for a few years now.	Not specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
30/4/2021	Not Specified	11436	EPA Environmental Line		Odour	Letter	Collector Road, Tarago	The complainant said the odour is overpowering, disgusting and extremely unpleasant and it is noticeable almost every morning.	Not specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
29/4/2021	7:00:00 am	11436	Phone (Direct)		Odour	Letter	Braidwood Road, Tarago	The complainant reported noticing the odour inside his home when he awoke the morning at 7:00am. The complainant reported noticing the odour for the last 10 years but the last 2 years had been worse, and the odour seems to dissipate when the sun comes up.	3 1/2 hours	Site Management explained that several improvement projects are currently underway to reduce odour and that a report would be submitted to the EPA based on the information being provided. Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.

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Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
29/4/2021	7:00:00 am	11436	Community Feedback Line		Odour	Letter	Mulwaree Street, Tarago	The complainant reported noticing the odour inside their home at around 7am and noticed the smell was stronger when going outside. The smell was described as a rubbishy smell and a gas bottle smell. Similar to the odour added to gas bottles so you know if it is leaking. It had a hint of rotten egg, but that was overpowered by the gassy smell.	1 1/2 hours	Site Management explained that several improvement projects are currently underway to reduce odour and that a report would be submitted to the EPA based on the information being provided. Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
29/4/2021	6:30:00 am	11436	Community Feedback Line		Odour	Letter	Mooneys Road, Currawang	The complainant reported a sickly sweet odour that was more like rotten egg than a gassy smell. The complainant reported that they only used to notice it when driving past the Bioreactor, but recently they have started to detect it at their home.	1+ hours	Site Management explained that several improvement projects are currently underway to reduce odour and that a report would be submitted to the EPA based on the information being provided. Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
29/4/2021	8:30:00 am	11436	Phone (Direct)		Odour	Letter	Between Lake Bathurst & Tarago	The complainant reported noticing the odour between Lake Bathurst and Tarago on their way to work. The odour was described as a rotten, gassy smell.	Not specified	Site Management explained that several improvement projects are currently underway to reduce odour and that a report would be submitted to the EPA based on the information being provided. Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
29/4/2021	Not Specified	11436	EPA Environmental Line		Odour	Letter	Lumley Road, Tarago	The complainant reported the odour is an ongoing problem and it smells like rotten eggs and has been getting worse in foggy conditions.	Not specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
29/4/2021	9:00:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago Public School	The complainant reported being impacted by an offensive odour when dropping their children off at Tarago Public School at approx. 9am that morning.	Not specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
28/4/2021	11:00:00 am	11436	EPA Environmental Line		Odour	Letter	Mulwaree Street, Tarago	The complainant stated that there was “putrid rotting vegetation odour” in the air outside their home at 2pm on 28/4/21 . They said the odour is ‘awful’ when there is a SW wind and on Saturday (24/4/21) it was particularly bad.	Not specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
27/4/2021	Not Specified	11436	EPA Environmental Line		Odour	Letter	Collector Road, Tarago	The complainant said the odour is an ongoing problem and it smells like sulphur, and it has been getting worse over time. The caller alleged that the odour was coming from the Woodlawn Bioreactor, and Crisps Creek Transfer station.	Not specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
27/4/2021	12:00:00 pm	11436	EPA Environmental Line		Odour	Letter	Collector Road, Tarago	The complainant stated the odour is an ongoing problem and it smells like rotting household garbage smell with the odour being incredibly strong at 12:00 pm.	Not specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
26/04/2021	11:00:00 am	11436	EPA Environmental Line	EPA-1766	Odour	Letter	Lake Bathurst	The complainant contacted the EPA’s Environment Line to complain about an odour allegedly coming from the Bioreactor. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	4 hours	In consultation with the NSW EPA, amendments have been made to conditions of Veolia’s EPL aimed at improving odour management at the premises, the majority of which have already been implemented.

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Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
26/4/2021	12:02:00 pm	11436	Community Feedback Line		Odour	Letter	Mulwaree Street, Tarago	The complainant reported a rotten odour as he was driving past Collector Rd on his way home and it was also present at his home. The complainant reported that the odours had been getting worse of late.	Not specified	Site Management explained that several improvement projects are currently underway to reduce odour and that a report would be submitted to the EPA based on the information being provided. Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
26/4/2021	10:20:00 am	11436	Community Feedback Line		Odour	Letter	King Street, Tarago	The complainant reported an acidic smell like vinegar, not sewerage.	2 hours	Site Management explained that several improvement projects are currently underway to reduce odour and that a report would be submitted to the EPA based on the information being provided. Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
26/4/2021	10:00:00 am	11436	EPA Environmental Line		Odour	Letter	Braidwood Road, Tarago	The complainant stated that several members of a local club on Braidwood Road Tarago had noticed an odour at 10am which was still very strong, sickly and exceedingly unpleasant at 11.20am.	1 hour 20 minutes	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
26/4/2021	9:00:00 am	11436	EPA Environmental Line		Odour	Letter	Collector Road, Tarago	The caller said it is an extremely strong odour and noticed a slight breeze coming from the West.	1 hour 40 minutes	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
26/04/2021	8:45:00 am	11436	EPA Environmental Line		Odour	Letter	Currawang	The complainant reported rotten sour garbage type odour they have been experiencing.	2 hours	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
26/4/2021	11:06:00 am	11436	EPA Environmental Line		Odour	Letter	King Street, Tarago	The complainant reported being affected by an offensive odour attributed to the Woodlawn landfill.	Not specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
26/4/2021	Not Specified	11436	EPA Environmental Line		Odour	Letter	King Street, Tarago	The complainant said the odour is offensive and it is an ongoing problem.	Not specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
26/4/2021	7:00:00 am	11436	EPA Environmental Line		Odour	Letter	Mooney's Road, Currawang	The complainant reported rotten rubbish and off egg odours from 7am. The complainant said they had been impacted by landfill odours 3 to 5 times last month and it seems to be worse on still foggy mornings. The complaint said it had become worse over the last 6-12 months.	1 3/4 hours	Site Management explained that several improvement projects are currently underway to reduce odour and that a report would be submitted to the EPA based on the information being provided. Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
26/04/2021	Various	11436	EPA Environmental Line		Odour	Letter	Mooneys Road, Currawang	The complainant reported multiple dates and times for when they have experienced the odour. They have described the odour as an open sewer and rotten egg smell, and have said they got a runny nose and itchy eyes from it.	Various	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. A series of operational improvements have already been identified and are being progressively acted upon. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting on Monday 10th May, 2021.

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Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
26/04/2021	12:00:00 pm	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant reported a rotten garbage/egg smell they have been experiencing.	Approx 5 hours	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
26/4/2021	10:30:00 am	11436	Community Feedback Line		Odour	Letter	Tarago	The complainant reported a sewer smell today.	20 minutes	Site Management tried to call the complainant back on several occasions to get some more information about the location at which the odour was detected. Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
26/4/2021	10:30:00 am	11436	Phone (Direct)		Odour	Letter	Tarago Public School	The complainant reported a gassy horrible smell that sticks in the back of your throat.	Not specified	It was explained to the complainant that operational improvements have been identified and are being progressively acted upon. Site Management attended Tarago Public School immediately following the complaint and was unable to meet the complainant at the school as they had left following the report being made. No odour was detected on the school grounds upon arrival. On entering Tarago from Bungendore Road, an odour was evident that was not similar to odours experienced at the site and was unable to be identified the source as it dissipated very quickly. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
25/4/2021	1:52:00 am	11436	Community Feedback Line		Odour	Letter	Mulwaree Street, Tarago	The complainant advised that he had experienced intermittent landfill odours during that evening of 24th April. The complainant could not provide specifics of intensity or duration of the odours.	Not specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
25/04/2021	10:00:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant reported an odour generally described as offensive, rotten-egg like, and smelling like dead animals.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
25/04/2021	11:00:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant reported a rotten garbage/egg smell they have been experiencing.	Approx 5 hours	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
24/4/2021	10:00:00 am	11436	EPA Environmental Line		Odour	Letter	Braidwood Road, Tarago	The complainant reported they experienced a strong sickly smell.	Not specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
24/4/2021	8:35:00 am	11436	EPA Environmental Line		Odour	Letter	Not Supplied	The complainant reported odour travelling through the window and doors of their property at 8:35am that morning. The reporter described the odour as an excrement and bile smell. The caller explained that this issue is ongoing and present all day.	Not specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
24/04/2021	10:00:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant reported an odour generally described as offensive, rotten-egg like, and smelling like dead animals.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
24/04/2021	10:00:00 am	11436	EPA Environmental Line		Odour	Letter	Tarago	The complainant reported a rotten garbage/egg smell they have been experiencing.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.

Woodlawn Bioreactor Complaints Register

Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
23/4/2021	Various	11436	EPA Environmental Line		Odour	Letter	Hilltop Close, Tarago	The complainant detected odour on the 23/04, 24/04 & 28/04. The caller was concerned that the odours are being detected more frequently in recent weeks and months.	Not specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
22/4/2021	8:00:00 am	11436	EPA Environmental Line		Odour	Letter	Rosebery Street, Tarago	The complainant reported odours had been affecting him at home that morning and for the previous four days. He said the odours were intermittent and the strength varied from mild to overpowering.	Not specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
22/4/2021	6:30:00 am	11436	EPA Environmental Line		Odour	Letter	Goulburn Street, Tarago	The complainant reported being affected by strong, offensive odour that morning, which continued until the wind picked up. They also experienced the odour the day before on 21 April 2021, in the morning and night (no times specified). The caller reported that the odour is typically present when there is little wind and noted an increase in frequency and strength of the odour in recent months.	Not specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
22/4/2021	10:00:00 pm	11436	EPA Environmental Line		Odour	Letter	Leahys Lane, Tarago	The complainant reported a strong odour outside and inside her home. The caller rated the odour a 5 out of 6 and could not be outside of their property more than a few seconds. The description of the odour was rotten-egg and rotten garbage. The caller said that the conditions at the time of the incident were cold and still, but windy before that.	Not specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
21/4/2021	2:27:00 pm	11436	EPA Environmental Line		Odour	Letter	Braidwood Road, Lake Bathurst	The complainant reported she was being affected by an offensive sour, sulphurous odour from around 2pm that day. She said there was a light westerly wind. She said that the odour has been present for the last few days.	1/2 hour	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
21/4/2021	6:00:00 am	11436	EPA Environmental Line		Odour	Letter	Lake Bathurst	The complainant advised that they had experienced landfill odours in the village on very rare occasions in the past, but had been impacted by strong landfill odours each morning over the past two weeks from around 6am when out for their morning walk. The odour was first noticed from 6am and had become even more intense by 8am when they left their house to go to work.	2+ hours	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
20/4/2021	8:00:00 am	11436	Phone (Direct)		Odour	Letter	Tarago Public School	The complainant advised that a "pungent, gassy" smell appeared to be coming for the Bioreactor this morning. She mentioned that it could be a train and checked the gas tank for any odour prior to calling.	1/2 - 1 hour	Site Management explained to the complainant that operational improvements have been identified and are being progressively acted upon. Veolia recently attended a TADPAI meeting where the community was presented with a detailed audit of the biogas extraction system. The presentation was around how biogas is generated, the composition and odorous compounds that exist. A series of operational improvements have been identified and are being progressively acted upon. These include additional wells in areas identified in recent waste placement occurred on the western side of the site, and expansion of the biofiltration media to the void wall/waste interface. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.

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Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
19/4/2021	10:57:00 am	11436	Community Feedback Line		Odour	Letter	Willow Glen Road, Tarago	The complainant reported smelling an odour coming from the Woodlawn Bioreactor fairly regularly in the mornings. They described the odour as having a distinct "ripe" or "rotten" character.	1/2 - 1 hour	Site Management explained to the complainant that operational improvements have been identified and are being progressively acted upon. Veolia recently attended a TADPAI meeting where the community was presented with a detailed audit of the biogas extraction system. The presentation was around how biogas is generated, the composition and odorous compounds that exist. A series of operational improvements have been identified and are being progressively acted upon. These include additional wells in areas identified in recent waste placement occurred on the western side of the site, and expansion of the biofiltration media to the void wall/waste interface. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
19/4/2021	9:50:00 am	11436	EPA Environmental Line		Odour	Letter	The Loaded Dog, Tarago	The complainant reported that they had detected a strong garbage odour as they drove into Tarago village on Braidwood Road a few minutes before their call. They said they were driving in past the Loaded Dog Hotel with their windows up and smelt the odour come in to the car through the air vents.	Not specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will continue to assess the operation to understand what improvements can be made to the operation and performance of the site. Veolia recently attended a TADPAI meeting where the community was presented with a detailed audit of the biogas extraction system. The presentation was around how biogas is generated, the composition and odorous compounds that exist. A series of operational improvements have been identified and are being progressively acted upon.
19/4/2021	7:00:00 am	11436	Community Feedback Line		Odour	Letter	Hilltop Close, Tarago	The complainant reported that they had smelt an odour coming for the Bioreactor whilst she was outside her residence at 7am on 19/4/21. They stated that they do smell the odour on the odd occasion but it wasn;t until recent discussions in a community group that she was told that Veolia would appreciate being told to assist in they're onsite investigations.	Not specified	Site Management explained to the complainant that operational improvements have been identified and are being progressively acted upon. Veolia recently attended a TADPAI meeting where the community was presented with a detailed audit of the biogas extraction system. The presentation was around how biogas is generated, the composition and odorous compounds that exist. A series of operational improvements have been identified and are being progressively acted upon. These include additional wells in areas identified in recent waste placement occurred on the western side of the site, and expansion of the biofiltration media to the void wall/waste interface. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
18/4/2021	4:00:00 pm	11436	EPA Environmental Line		Odour	Letter	Mulwaree Street, Tarago	The complainant reported that they were being affected by offensive landfill odour at their home.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will continue to assess the operation to understand what improvements can be made to the operation and performance of the site. Veolia recently attended a TADPAI meeting where the community was presented with a detailed audit of the biogas extraction system. The presentation was around how biogas is generated, the composition and odorous compounds that exist. A series of operational improvements have been identified and are being progressively acted upon.

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Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
17/4/2021	10:59:00 am	11436	EPA Environmental Line		Odour	Letter	Steeepers Lane, Mt Fairy	The complainant reported that they had woken up to a strong garbage smell in the air that morning. They said the air was very still at the time. The caller said the smell is rare at their location but is becoming more regular. They said the last time they had noticed it before Saturday was 2 weeks prior.	Not specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will continue to assess the operation to understand what improvements can be made to the operation and performance of the site. Veolia recently attended a TADPAI meeting where the community was presented with a detailed audit of the biogas extraction system. The presentation was around how biogas is generated, the composition and odorous compounds that exist. A series of operational improvements have been identified and are being progressively acted upon.
17/4/2021	9:23:00 am	11436	Community Feedback Line		Odour	Letter	Taylors Creek Road, Tarago	The complainant reported detecting an odour allegedly coming from the Woodlawn Bioreactor. They stated that they don't smell it very often however it was stronger than usual that morning.	Not Specified	Veolia recently attended a TADPAI meeting where the community was presented with a detailed audit of the biogas extraction system. The presentation was around how biogas is generated, the composition and odorous compounds that exist. A series of operational improvements have been identified and are being progressively acted upon. These include additional wells in areas identified in recent waste placement occurred on the western side of the site, and expansion of the biofiltration media to the void wall/waste interface. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
15/4/2021	6:46:00 am	11436	Phone (Direct)		Odour	Letter	Mayfield Road, Tarago	The complainant reported “a rotten food smell” allegedly coming from the Woodlawn Bioreactor. The odour was reported as being similar to what they occasionally smell when driving past the Bioreactor on their way to work.	Not Specified	Veolia recently attended a TADPAI meeting where the community was presented with a detailed audit of the biogas extraction system. The presentation was around how biogas is generated, the composition and odorous compounds that exist. A series of operational improvements have been identified and are being progressively acted upon. These include additional wells in areas identified in recent waste placement occurred on the western side of the site, and expansion of the biofiltration media to the void wall/waste interface. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
15/4/2021	7:00:00 am	11436	EPA Environmental Line		Odour	Letter	Mulwaree Street, Tarago	The complainant reported a strong odour experienced at 7am this morning at their house. They rated the smell a 7-8. The odour had the character of ‘rotten food’, which lingered for a couple of hours. They mentioned that they smell the landfill every couple of days.	1-2 hours	Veolia recently attended a TADPAI meeting where the community was presented with a detailed audit of the biogas extraction system. The presentation was around how biogas is generated, the composition and odorous compounds that exist. A series of operational improvements have been identified and are being progressively acted upon. These include additional wells in areas identified in recent waste placement occurred on the western side of the site, and expansion of the biofiltration media to the void wall/waste interface. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
13/4/2021	4:30:00 pm	11436	Community Feedback Line		Odour	Letter	Braidwood Road, Tarago	The complainant reported that an odour from the Woodlawn Bioreactor was detected at his property from around 4.30pm yesterday that became particularly strong between 8pm and 9pm.	Not Specified	Veolia recently attended a TADPAI meeting where the community was presented with a detailed audit of the biogas extraction system. The presentation was around how biogas is generated, the composition and odorous compounds that exist. A series of operational improvements have been identified and are being progressively acted upon. These include additional wells in areas identified in recent waste placement occurred on the western side of the site, and expansion of the biofiltration media to the void wall/waste interface. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.

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Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
13/4/2021	8:00:00 pm	11436	EPA Environmental Line		Odour	Letter	Braidwood Road, Tarago	The complainant reported that a “stench” was coming into their house last night and having previously made numerous reports to the EPA, was very upset that previous promises about controlling the odour have not been realised.	Not Specified	Veolia recently attended a TADPAI meeting where the community was presented with a detailed audit of the biogas extraction system. The presentation was around how biogas is generated, the composition and odorous compounds that exist. A series of operational improvements have been identified and are being progressively acted upon. These include additional wells in areas identified in recent waste placement occurred on the western side of the site, and expansion of the biofiltration media to the void wall/waste interface. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
13/4/2021	8:00:00 pm	11436	EPA Environmental Line		Odour	Letter	Bungendore Road, Tarago	The complaint reported experiencing a strong odour whilst travelling past the Intermodal Facility and also on Collector Road on Tuesday 13 April 2021 at 8:00pm, then again on Wed 14 April 2021 at 4:00am. They rated the smell a 10/10. The odour had the character of “rotten rubbish” not like the usual “rotten egg” smell.	Not Specified	Veolia recently attended a TADPAI meeting where the community was presented with a detailed audit of the biogas extraction system. The presentation was around how biogas is generated, the composition and odorous compounds that exist. A series of operational improvements have been identified and are being progressively acted upon. These include additional wells in areas identified in recent waste placement occurred on the western side of the site, and expansion of the biofiltration media to the void wall/waste interface. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
12/4/2021	9:15:00 am	11436	EPA Environmental Line		Odour	Letter	Braidwood Road, Tarago	The complainant reported noticing a strong odour outside her home at 9:15am. The odour did not stay around the property for long. The odour was not a waste smell, more like a rotten egg/ processing smell. The conditions were clear with a gentle breeze.	Not Specified	Veolia recently attended a TADPAI meeting where the community was presented with a detailed audit of the biogas extraction system. The presentation was around how biogas is generated, the composition and odorous compounds that exist. A series of operational improvements have been identified and are being progressively acted upon. These include additional wells in areas identified in recent waste placement occurred on the western side of the site, and expansion of the biofiltration media to the void wall/waste interface. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
12/4/2021	7:30:00 am	11436	EPA Environmental Line		Odour	Letter	Mulwaree Street, Tarago	The complainant reported that there was an odour that “smells like rotting garbage” in the air outside their home when they went outside at 7:30am that morning. They also reported that they had detected the same odour outside their home at 9am on 10th of April, 2021	Not Specified	Veolia recently attended a TADPAI meeting where the community was presented with a detailed audit of the biogas extraction system. The presentation was around how biogas is generated, the composition and odorous compounds that exist. A series of operational improvements have been identified and are being progressively acted upon. These include additional wells in areas identified in recent waste placement occurred on the western side of the site, and expansion of the biofiltration media to the void wall/waste interface. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.
10/04/2021	7:00:00 pm	11436	EPA Environmental Line		Odour	Letter	Loaded Dog Hotel, Tarago	The complainant reported that they had been “greeted by a putrid smell that was nauseating” when they got out of their car outside the Loaded Dog Hotel in Tarago on Saturday night (10 April 2021).	Not Specified	Veolia recently attended a TADPAI meeting where the community was presented with a detailed audit of the biogas extraction system. The presentation was around how biogas is generated, the composition and odorous compounds that exist. A series of operational improvements have been identified and are being progressively acted upon. These include additional wells in areas identified in recent waste placement occurred on the western side of the site, and expansion of the biofiltration media to the void wall/waste interface. Veolia will provide an update on the progress and effect of these actions in the next TADPAI meeting.

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Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
08/04/2021	6:15:00 pm	11436	Other		Odour	Letter	Mulwaree Street, Tarago	The complainant reported a dreadful smell coming off the Woodlawn Bioreactor. They stated that the odour started first thing in the morning and lasted until the afternoon. It had a rotten egg smell to it.	All Day	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will continue to assess the operation to understand what improvements can be made to the operation and performance of the site.
04/04/2021	1:30:00 pm	11436	EPA Environmental Line	EPA-1766	Odour	Letter	Lake Bathurst	The complainant contacted the EPA's Environment Line to complain about an odour allegedly coming from the Bioreactor. They have generally described the odour as being offensive with a strong sulphur-like, rotting garbage smell.	Not Specified	In consultation with the NSW EPA, amendments have been made to conditions of Veolia's EPL aimed at improving odour management at the premises, the majority of which have already been implemented.
03/04/2021	10:16:00 am	11436	E-mail		Odour	Letter	Coghill Road, Tarago	The complainant reported that they reside 15kms past Tarago off Willow Glen Road and can smell Veolia. They advised that they often smell the stench particularly first thing in the morning or later in the evening.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will continue to assess the operation to understand what improvements can be made to the operation and performance of the site.
31/03/2021	6:50:00 am	11436	EPA Environmental Line		Odour	Letter	Rosebery Street, Tarago	The complainant reported there was a mild landfill odour outside his house when he went outside at 6:45am. He said the same odour has been present around this time for the last 3-4 days.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will continue to assess the operation to understand what improvements can be made to the operation and performance of the site.
31/03/2021	7:15:00 am	11436	E-mail		Odour	Letter	Rosebery Street, Tarago	The complainant reported that this was the fourth day in a row that they have smelled the bio odour and felt that it should be reported.	Not Specified	The Eco-Precinct Environmental Officer was in the vicinity of the complainants location approximately 20mins after the report was received however was unable to detect or identify any odour at the time. Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.
31/03/2021	8:00:00 am	11436	EPA Environmental Line		Odour	Letter	Mulwaree Street, Tarago	The complainant reported that there was a "strong smell of methane /garbage" in the air outside their home when they went outside at 7am this morning. They said they regularly smell landfill odours outside their house on cold foggy mornings like today. They said they smell the odour a few times each week and it is usually much worse following heavy rain.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will continue to assess the operation to understand what improvements can be made to the operation and performance of the site.
29/03/2021	8:04:00 am	11436	EPA Environmental Line		Odour	Letter	Leahys Lane, Tarago	The complainant reported that there was "a smell of rotten garbage" at their house allegedly coming from the Woodlawn Bioreactor. They said they first noticed it at 7:30am. They rated the strength of the odour as 5 out of 6.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will continue to assess the operation to understand what improvements can be made to the operation and performance of the site.
29/03/2021	8:37:00 am	11436	EPA Environmental Line		Odour	Letter	Mulwaree Street, Tarago	The complainant reported that they had experienced "a very strong methane smell" at their house from about 8am. They said it was a particularly foggy morning.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. No further contact or follow-up can be made due to the anonymity of the complainant.
29/03/2021	2:15:00 pm	11436	EPA Environmental Line		Odour	Letter	Roseberry Street, Tarago	The complainant reported that there was "an unbelievably pungent landfill odour" in the air outside their home at around 5: 30am this morning. They said they regularly smell landfill odours outside their house on foggy mornings but this morning's odour was the worst they have ever smelt.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. No further contact or follow-up can be made due to the anonymity of the complainant.
28/03/2021	9:34:00 am	11436	EPA Environmental Line		Odour	Letter	Glenoval Road, Lake Bathurst	The complainant reported that there was "a very strong methane smell" in the air outside their home at around 8am. They said they smelt the odour when they went outside their house at 8am and it was still present but dissipating at the time of their call. They said it was very foggy at 8am but that the fog was lifting at the time of their call. The complainant also reported that a similar odour was present again at the same time on Monday 29th March but not as strong as the previously reported.	1.5hr/Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. No further contact or follow-up can be made due to the anonymity of the complainant.

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Date	Time	EPL	Method	EPA ID	Type	Response	Location	Description	Duration	Response/action taken to resolve the complaint
08/03/2021	5:19:00 pm	11436	Phone (Direct)		Odour	Letter	Braidwood Road, Lake Bathurst	The complainant reported that there was a strong smell on his property present at the time of his call.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will continue to assess the operation to understand what improvements can be made to the operation and performance of the site.
02/03/2021	4:13:00 pm	11436	EPA Environmental Line		Odour	Letter	Leahys Lane, Tarago	The complainant reported “a very strong odour of dirty nappies and sour milk” at their house and the odour was also “a little bit swampy”. They said they first noticed it at 7:30am and that there was no wind and a very thick fog present. The caller said they were unable to put washing out and had to lock their house up. The odour was still present at the time of the call at 8:40am.	I hour	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will continue to assess the operation to understand what improvements can be made to the operation and performance of the site.
02/03/2021	4:32:00 pm	11436	EPA Environmental Line		Odour	Letter	Mulwaree Road, Tarago	The complainant reported “a very strong putrid odour” inside their house at about 7:30am. They said they had left their bathroom window ajar overnight and when they went into the bathroom they noticed the odour. The odour had permeated in from outside and that they had to close the window to stop it coming in.	Not Specified	Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour. Veolia will continue to assess the operation to understand what improvements can be made to the operation and performance of the site.
01/03/2021	8:16:00 am	11436	Community Feedback Line		Odour	Leter	Mayfield Road, Tarago	The complainant reported a “smell that would make you vomit”. The resident stated that her partner had noticed an odour yesterday morning. They advised that the odour is typically evident on mornings where fog was present and dissipated when the fog lifted.	Approx 3hrs	Site Management attended the residents property in an attempt to identify the odour immediately on receipt of the odour complaint. On arrival, no odour was evident and fog was lifting. The complainant was invited to a site visit to help identify the possible odour source. The invitation was accepted.
01/03/2021	7:25:00 pm	11436	E-mail		Odour	Letter	Goulburn Street, Tarago	The complainant reported “a very strong smell of rubbish” was throughout the house when they woke up that morning and was evident again that same afternoon.	1 hour	The complainant has been invited to keep an odour diary that will be considered as part of the Independent Odour Audit. The invitation was accepted. Based on the complainant's information, an assessment of meteorological data and operational activity has been completed in order to investigate the potential source or cause of odour.

EMISSION TESTING REPORTS: WOODLAWN BIOGAS POWER STATION:

R010872 & R011837 [DRAFT]

REPORT NUMBER R010872

Emission Testing Report
Veolia Environmental Services (Australia) Pty Ltd
Woodlawn Biogas Power Station, Tarago

Document Information

Template Version; 230621

Client Name:	Veolia Environmental Services (Australia) Pty Ltd
Report Number:	R010872
Date of Issue:	19 November 2021
Attention:	Christian Chang
Address:	619 Collector Rd Tarago NSW 2580
Testing Laboratory:	Ektimo Pty Ltd, ABN 86 600 381 413

Report Authorisation

NATA Accredited Laboratory
No. 14601

Scott Woods
Air Monitoring Consultant

Steven Cooper
Ektimo Signatory

Accredited for compliance with ISO/IEC 17025 - Testing. NATA is a signatory to the ILAC mutual recognition arrangement for the mutual recognition of the equivalence of testing, calibration and inspection reports.

Please note that only numerical results pertaining to measurements conducted directly by Ektimo are covered by Ektimo's terms of NATA accreditation. This does not include comments, conclusions or recommendations based upon the results. Refer to 'Test Methods' for full details of testing covered by NATA accreditation.

Table of Contents

1 EXECUTIVE SUMMARY

1.1 *Background*

Ektimo was engaged by Veolia Environmental Services (Australia) Pty Ltd to perform emission testing at their Tarago plant. Testing was carried out in accordance with Environment Protection Licence 11436.

1.2 *Project Objectives*

The objectives of the project were to conduct a monitoring programme to quantify emissions from 2 monitoring points to determine compliance with Veolia Environmental Services (Australia) Pty Ltd's Environmental Licence.

Monitoring was performed as follows:

Location	Test Date	Test Parameters*
EPA 8 – Engine 2 Exhaust Stack	26 May 2021	Hydrogen sulfide Sulfuric acid mist and sulfur trioxide (as SO_3) Nitrogen oxides, carbon monoxide, sulfur dioxide, carbon dioxide, oxygen
	30 August 2021	Carbon dioxide, oxygen Volatile organic compounds (VOCs) Destruction efficiency
EPA 5 – LFG Supply	30 August 2021	Carbon dioxide, oxygen Volatile organic compounds (VOCs)

* Flow rate, velocity, temperature, molecular weight, dry gas density and moisture were also determined.

All results are reported on a dry basis at STP.

At EPA 5 (LFG Supply) temperature and flowrate parameters were supplied by Veolia personnel.

Plant operating conditions have been noted in the report.

1.3 *Licence Comparison*

The following licence comparison table shows that all analytes highlighted in green are within the licence limit set by the NSW EPA as per licence 11436 (last amended on 4 March 2020).

EPA No.	Location Description	Pollutant	Units	Licence Limit	Detected Values
8	Engine 2 Exhaust Stack	Hydrogen Sulfide	mg/m^3	5	**<0.7**
		Sulfuric acid mist and sulfur trioxide (as SO_3)	mg/m^3	100	**4.5**
		Nitrogen Oxides	mg/m^3 @ 7% O_2	450	**440**
		Volatile organic compound destruction efficiency	%	≥ 98	**99.0**

*Please note that the measurement uncertainty associated with the test results **was not** considered when determining whether the results were compliant or non-compliant.*

Refer to the Test Methods table for the measurement uncertainties.

2 SAMPLING PLANE COMPLIANCE

Ektimo assessed the engine exhaust stack sampling plane criteria and selection of sampling points outlined in NSW TM-1 (Australian Standard 4323.1 -1995). In this method, the selection of sampling plane position calls for an Ideal sampling plane to be located in a straight, preferably vertical section of stack or duct away from any flow obstructions which may cause a disturbance or other instability to the gas flow. This position will be found to exist at 7-8 hydraulic diameters downstream and 2-3 hydraulic diameters upstream from a flow disturbance. In the case of the EPA point 8 engine exhaust stack, the sampling plane is located 4 hydraulic diameters downstream of a junction and 2 hydraulic diameters from the exit. See table 1 for details.

TABLE 1

CRITERIA FOR SELECTION OF SAMPLING PLANES

Type of flow disturbance	Minimum distance upstream from disturbance, diameters (*D*)	Minimum distance downstream from disturbance, diameters (*D*)
Bend, connection, junction, direction change	>2*D*	>6*D*
Louvre, butterfly damper (partially closed or closed)	>3*D*	>6*D*
Axial fan	>3*D*	>8*D* (see Note)
Centrifugal fan	>3*D*	>6*D*

NOTE: The plane should be selected as far as practicable from a fan. Flow straighteners may be required to ensure the position chosen meets the check criteria listed in Items (a) to (f) below.

In addition the following criteria must be met.

a) The gas velocity is basically in the same direction at all points along each sampling traverse.

b) The gas velocity at all sampling points is greater than 3 m/s.

c) The gas flow profile at the sampling plane shall be steady, evenly distributed and not have a cyclonic component which exceeds an angle of 15° to the duct axis, when measured near the periphery of a circular sampling plane

d) The temperature difference between adjacent points of the survey along each sampling traverse is less than 10% of the absolute temperature, and the temperature at any point differs by less than 10% from the mean.

e) The ratio of the highest to lowest pitot pressure difference shall not exceed 9:1 and the ratio of highest to lowest gas velocities shall not exceed 3:1. For isokinetic testing the use of impingers, the gas velocity ratio across the sampling plane should not exceed 1.6:1

f) The gas temperature at the sampling plane should preferably be above the dewpoint.

If the criteria of items (a) to (f) cannot be achieved a new sampling position shall be selected. The EPA point 8 engine exhaust stack meets all criteria of (a) to (f) and is suitable, therefore a new sampling position is not required, although an increased number of sampling points shall be used in accordance with clause 4.2 (non-ideal sampling positions) of AS 4323.1-1995.

Clause 4.2 proposes that if the criteria of table 1 cannot be met then a greater number of points shall be used in order to retain as much accuracy as is practicable, by applying the appropriate sampling point factors from *table 2*. The product of both the upstream and downstream factors multiplied by the total number of sampling points from *table 3* should then be raised to the next even number of sampling points for each sampling traverse.

TABLE 2

SAMPLING POINT FACTORS

Non-ideal situation	Sampling point factors
Sampling plane downstream from disturbance:	
Diameters less than Table 1	
0	1.00
1	1.05
2	1.10
3	1.15
4 or more	1.20
Sampling plane upstream from disturbance:	
Diameters less than Table 1	
0	1.00
0.5	1.05
1.0	1.10
1.5 or more	1.15

TABLE 3

MINIMUM NUMBER OF SAMPLING POINTS FOR CIRCULAR SAMPLING PLANES

Sampling plane diameter m		Minimum number of sampling traverses	Minimum number of access holes	Minimum number of sampling points per radius	Minimum total number of sampling points
>0.20	≤0.35	2	2	1	4
>0.35	≤0.70	2	2	2	8
>0.70	≤1.50	2	2	3	12
>1.50	≤2.50	2	4	4	16
>2.50	≤4.00	2	4	6	24
>4.00	≤6.00	3	6	5	30
>6.00		3	6	6	36

By example, the EPA point 8 engine exhaust stack has a sampling plane diameter of 350mm. If an ideal sampling plane was available the total number of sampling points would equate to 4. For this location, we have used a sampling point factor of 1.10 which yields a total number of sampling points of 8.

3 RESULTS

3.1 *EPA 8 – Engine 2 Exhaust Stack*

Date	26/05/2021	**Client**	Veolia Environmental Services (Australia) Pty Ltd
Report	R010872	**Stack ID**	EPA 8 - Engine 2 Exhaust Stack
Licence No.	11436	**Location**	Tarago
Ektimo Staff	Scott Woods and Steven Cooper	**State**	NSW
Process Conditions	Load: 1047kW		

Sampling Plane Details	
Sampling plane dimensions	350 mm
Sampling plane area	0.0962 m²
Sampling port size, number	4" Flange (x2)
Access & height of ports	Elevated work platform 10 m
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 2 D
Upstream disturbance	Junction 4 D
No. traverses & points sampled	2 8
Sample plane compliance to AS4323.1	Compliant but non-ideal

The sampling plane is deemed to be non-ideal due to the following reasons:
The sampling plane is too near to the upstream disturbance but is greater than or equal to 2D

Stack Parameters		
Moisture content, %v/v	12	
Gas molecular weight, g/g mole	29.0 (wet)	30.4 (dry)
Gas density at STP, kg/m³	1.29 (wet)	1.36 (dry)
% Oxygen correction & Factor	7 %	1.08
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1125 & 1245	
Temperature, °C	449	
Temperature, K	722	
Velocity at sampling plane, m/s	49	
Volumetric flow rate, actual, m³/s	4.8	
Volumetric flow rate, actual, m³/hour	17000	
Volumetric flow rate (wet STP), m³/s	1.6	
Volumetric flow rate (wet STP), m³/hour	5800	
Volumetric flow rate (dry STP), m³/s	1.4	
Volumetric flow rate (dry STP), m³/hour	5000	
Mass flow rate (wet basis), kg/hour	7600	
Velocity difference, %	-8	

Date	26/05/2021	**Client**	Veolia Environmental Services (Australia) Pty Ltd
Report	R010872	**Stack ID**	EPA 8 - Engine 2 Exhaust Stack
Licence No.	11436	**Location**	Tarago
Ektimo Staff	Scott Woods and Steven Cooper	**State**	NSW
Process Conditions	Load: 1047kW		210506

Gas Analyser Results	Average			Minimum			Maximum		
Sampling time	1134 - 1234			1134 - 1234			1134 - 1234		
		Corrected to			Corrected to			Corrected to	
	Concentration mg/m³	7% O2 mg/m³	Mass Rate g/min	Concentration mg/m³	7% O2 mg/m³	Mass Rate g/min	Concentration mg/m³	7% O2 mg/m³	Mass Rate g/min
Combustion Gases									
Nitrogen oxides (as NO_2)	410	440	36	390	420	34	430	460	37
Sulfur dioxide	570		49	550		48	580		50
Carbon monoxide	1200		100	1200		100	1200		110
		Concentration %v/v			Concentration %v/v			Concentration %v/v	
Carbon dioxide		12.3			12.3			12.4	
Oxygen		8			7.9			8.1	

Hydrogen Sulfide	Results	
Sampling time	1133-1233	
	Concentration mg/m³	Mass Rate g/min
Hydrogen sulfide	<0.7	<0.06

Isokinetic Results	Results	
Sampling time	1132-1237	
	Concentration mg/m³	Mass Rate g/min
Sulfur trioxide and/or Sulfuric acid (as SO3)	4.5	0.39
Isokinetic Sampling Parameters		
Sampling time, min	64	
Isokinetic rate, %	104	
Velocity difference, %	-8	

Date	30/08/2021	**Client**	Veolia Enviromental Services (Australia) Pty Ltd
Report	R010872	**Stack ID**	EPA 8 - Engine 2 Exhaust Stack
Licence No.	11436	**Location**	Tarago
Ektimo Staff	Scot Woods and Steven Cooper	**State**	NSW
Process Conditions	Load: 879kW		210823

Sampling Plane Details	
Sampling plane dimensions	350 mm
Sampling plane area	0.0962 m²
Sampling port size, number	4" Flange (x2)
Access & height of ports	Elevated work platform 10 m
Duct orientation & shape	Vertical Circular
Downstream disturbance	Exit 2 D
Upstream disturbance	Junction 4 D
No. traverses & points sampled	2 8
Sample plane compliance to AS4323.1	Compliant but non-ideal

The sampling plane is deemed to be non-ideal due to the following reasons:
The sampling plane is too near to the upstream disturbance but is greater than or equal to 2D

Stack Parameters		
Moisture content, %v/v	11	
Gas molecular weight, g/g mole	28.9 (wet)	30.2 (dry)
Gas density at STP, kg/m³	1.29 (wet)	1.35 (dry)
% Oxygen correction & Factor	7 %	1.13
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1200 & 1310	
Temperature, °C	453	
Temperature, K	726	
Velocity at sampling plane, m/s	45	
Volumetric flow rate, actual, m³/s	4.3	
Volumetric flow rate, actual, m³/h	15000	
Volumetric flow rate (wet STP), m³/s	1.5	
Volumetric flow rate (wet STP), m³/h	5400	
Volumetric flow rate (dry STP), m³/s	1.3	
Volumetric flow rate (dry STP), m³/s	4700	
Mass flow rate (wet basis), kg/hour	6900	
Velocity difference, %	-2	

Gas Analyser Results	Average	
Sampling time	1136 - 1246	
Combustion Gases	Concentration %v/v	
Carbon dioxide	10.8	
Oxygen	8.6	
Sampling time	1207 - 1309	
	Concentration mg/m³	Mass Rate g/min
Total Volatile Organic Compounds (VOCs)		
VOC (as n-propane)	140	11

Testing Parameter	Total Hydrocarbons (g/min)		
	LFG Inlet	Stack Outlet	Destruction Efficiency %
EPA Point 8 (Engine 2) Stack	1100	11	99.0

3.2 *EPA 5 – LFG Supply Line*

Date	30/08/2021	**Client**	Veolia Enviromental Services (Australia) Pty Ltd
Report	R010872	**Stack ID**	EPA 5 - LFG Supply
Licence No.	11436	**Location**	Tarago
Ektimo Staff	Scot Woods and Steven Cooper	**State**	NSW
Process Conditions	5 Engines in operation		*210823*

Sampling Plane Details		
Sampling plane dimensions	370 mm	
Sampling plane area	0.108 m²	
Sampling port size, number	1" BSP (x1)	
Access & height of ports	Ground level	1.5 m
Duct orientation & shape	Horizontal	Circular
Downstream disturbance	Change in diameter	2.2 D
Upstream disturbance	Connection	1.3 D
No. traverses & points sampled	1	1

Comments
Temperature and flow data supplied by Veolia personnel

Stack Parameters		
Moisture content, %v/v	0.47	
Gas molecular weight, g/g mole	34.0 (wet)	34.0 (dry)
Gas density at STP, kg/m³	1.52 (wet)	1.52 (dry)
Gas Flow Parameters		
Temperature, °C	3	
Temperature, K	276	
Velocity at sampling plane, m/s	7	
Volumetric flow rate, actual, m³/s	0.75	
Volumetric flow rate, actual, m³/h	2700	
Volumetric flow rate (wet STP), m³/s	0.81	
Volumetric flow rate (wet STP), m³/h	2900	
Volumetric flow rate (dry STP), m³/s	0.8	
Volumetric flow rate (dry STP), m³/h	2900	
Mass flow rate (wet basis), kg/hour	4400	

Gas Analyser Results	Average
Sampling time	1205 - 1305
	Concentration %v/v
Carbon dioxide	36.3
Oxygen	2.5
Sampling time	1205 - 1310
	Concentration mg/m³ / Mass Rate g/min
Total Volatile Organic Compounds (VOCs)	
VOC (as n-propane)	22000 / 1100

4 PLANT OPERATING CONDITIONS

On the days of sampling the Engine Load was 1047 kW (26/5/21) and 879 kW (30/8/21).

See Veolia Environmental Services (Australia) Pty Ltd's records for complete process conditions.

5 TEST METHODS

All sampling and analysis performed by Ektimo unless otherwise specified. Specific details of the methods are available upon request.

Parameter	Sampling Method	Analysis Method	Uncertainty*	NATA Accredited	
				Sampling	Analysis
Sampling points - Selection	NSW EPA TM-1	NA	NA	✓	NA
Flow rate, temperature and velocity	NSW EPA TM-2	NSW EPA TM-2	8%, 2%, 7%	NA	✓
Moisture content	NSW EPA TM-22	NSW EPA TM-22	19%	✓	✓
Carbon dioxide	NSW EPA TM-24	NSW EPA TM-24	13%	✓	✓
Carbon monoxide	NSW EPA TM-32	NSW EPA TM-32	12%	✓	✓
Nitrogen oxides	NSW EPA TM-11	NSW EPA TM-11	12%	✓	✓
Oxygen	NSW EPA TM-25	NSW EPA TM-25	13%	✓	✓
Sulfur dioxide	NSW EPA TM-4	NSW EPA TM-4	12%	✓	✓
Volatile organic compounds	NSW EPA TM-34	NSW EPA TM-34	not specified	✓	✓
Hydrogen sulfide	NSW EPA TM-5	NSW EPA TM-5	not specified	✓	✓†
Sulfuric acid mist and/or sulfur trioxide	NSW EPA TM-3	Ektimo 235	16%	✓	✓†

210809

* Uncertainties cited in this table are estimated using typical values and are calculated at the 95% confidence level (coverage factor = 2).

† Analysis conducted at the Ektimo Mitcham, VIC laboratory, NATA accreditation number 14601. Results were reported on
24th June 2021 in report LV-001578
18th June 2021 in report R010872 - H2S (Method 11).

6 QUALITY ASSURANCE/QUALITY CONTROL INFORMATION

Ektimo is accredited by the National Association of Testing Authorities (NATA) for the sampling and analysis of air pollutants from industrial sources. Unless otherwise stated test methods used are accredited with the National Association of Testing Authorities. For full details, search for Ektimo at NATA's website www.nata.com.au.

Ektimo is accredited by NATA (National Association of Testing Authorities) to ISO/IEC 17025 - Testing. ISO/IEC 17025 - Testing requires that a laboratory have adequate equipment to perform the testing, as well as laboratory personnel with the competence to perform the testing. This quality assurance system is administered and maintained by the Quality Director.

NATA is a member of APAC (Asia Pacific Accreditation Co-operation) and of ILAC (International Laboratory Accreditation Co-operation). Through mutual recognition arrangements with these organisations, NATA accreditation is recognised worldwide.

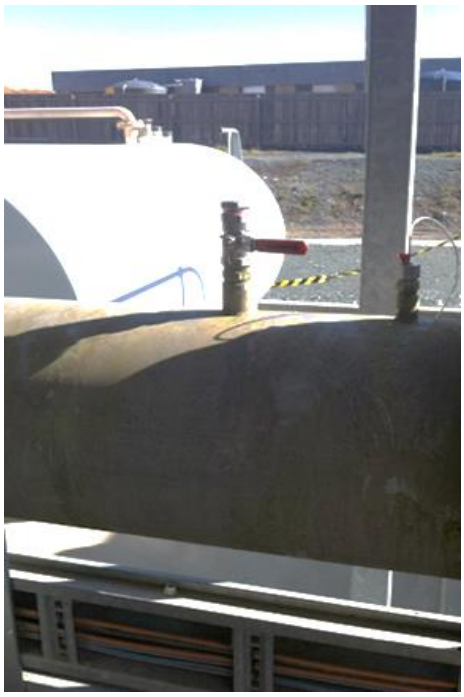
7 DEFINITIONS

The following symbols and abbreviations may be used in this test report:

% v/v	Volume to volume ratio, dry or wet basis
~	Approximately
<	Less than
>	Greater than
≥	Greater than or equal to
APHA	American Public Health Association, Standard Methods for the Examination of Water and Waste Water
AS	Australian Standard
BSP	British standard pipe
CARB	Californian Air Resources Board
CEM/CEMS	Continuous Emission Monitoring/Continuous Emission Monitoring System
CTM	Conditional test method
D	Duct diameter or equivalent duct diameter for rectangular ducts
D_{50}	'Cut size' of a cyclone is defined as the particle diameter at which the cyclone achieves a 50% collection efficiency i.e. half of the particles are retained by the cyclone and half pass through it. The D_{50} method simplifies the capture efficiency distribution by assuming that a given cyclone stage captures all of the particles with a diameter equal to or greater than the D_{50} of that cyclone and less than the D_{50} of the preceding cyclone.
DECC	Department of Environment & Climate Change (NSW)
Disturbance	A flow obstruction or instability in the direction of the flow which may impede accurate flow determination. This includes centrifugal fans, axial fans, partially closed or closed dampers, louvres, bends, connections, junctions, direction changes or changes in pipe diameter.
DWER	Department of Water and Environmental Regulation (WA)
DEHP	Department of Environment and Heritage Protection (QLD)
EPA	Environment Protection Authority
FTIR	Fourier Transform Infra-red
ISC	Intersociety Committee, Methods of Air Sampling and Analysis
ISO	International Organisation for Standardisation
ITE	Individual threshold estimate
Lower bound	When an analyte is not present above the detection limit, the result is assumed to be equal to zero.
Medium bound	When an analyte is not present above the detection limit, the result is assumed to be equal to half of the detection limit.
NA	Not applicable
NATA	National Association of Testing Authorities
NIOSH	National Institute of Occupational Safety and Health
NT	Not tested or results not required
OM	Other approved method
OU	Odour unit. One OU is that concentration of odorant(s) at standard conditions that elicits a physiological response from a panel equivalent to that elicited by one Reference Odour Mass (ROM), evaporated in one cubic metre of neutral gas at standard conditions.
PM_{10}	Atmospheric suspended particulate matter having an equivalent aerodynamic diameter of less than approximately 10 microns (µm).
$PM_{2.5}$	Atmospheric suspended particulate matter having an equivalent aerodynamic diameter of less than approximately 2.5 microns (µm).
PSA	Particle size analysis
RATA	Relative accuracy test audit
Semi-quantified VOCs	Unknown VOCs (those not matching a standard compound), are identified by matching the mass spectrum of the chromatographic peak to the NIST Standard Reference Database (version 14.0), with a match quality exceeding 70%. An estimated concentration is determined by matching the area of the peak with the nearest suitable compound in the analytical calibration standard mixture.
STP	Standard temperature and pressure. Gas volumes and concentrations are expressed on a dry basis at 0°C, at discharge oxygen concentration and an absolute pressure of 101.325 kPa, unless otherwise specified.
TM	Test method
TOC	The sum of all compounds of carbon which contain at least one carbon-to-carbon bond, plus methane and its derivatives.
USEPA	United States Environmental Protection Agency
VDI	Verein Deutscher Ingenieure (Association of German Engineers)
Velocity difference	The percentage difference between the average of initial flows and after flows.
Vic EPA	Victorian Environment Protection Authority
VOC	Volatile organic compound. A carbon-based chemical compound with a vapour pressure of at least 0.010 kPa at 25°C or having a corresponding volatility under the given conditions of use. VOCs may contain oxygen, nitrogen and other elements. VOCs do not include carbon monoxide, carbon dioxide, carbonic acid, metallic carbides and carbonate salts.
XRD	X-ray diffractometry
Upper bound	When an analyte is not present above the detection limit, the result is assumed to be equal to the detection limit.
95% confidence interval	Range of values that contains the true result with 95% certainty. This means there is a 5% risk that the true result is outside this range.

8 APPENDIX 1: SITE LOCATIONS

EPA Point 8 - Engine 2 Exhaust Stack



EPA Point 5 - LFG Supply

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Mitcham VIC 3132

Postal Address
52 Cooper Road
Cockburn Central WA 6164

Office Locations
VIC NSW WA QLD

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Ektimo

Veolia Environmental Services (Australia) Pty Ltd

Woodlawn Biogas Power Station, Tarago

Emission Testing Report

Report Number R011837[DRAFT]

DRAFT

Document Information

Template Version 211117

Client Name:	Veolia Environmental Services (Australia) Pty Ltd
Report Number:	R011837[DRAFT]
Date of Issue:	7 February 2022
Attention:	Christian Chang
Address:	619 Collector Rd Tarago NSW 2580
Testing Laboratory:	Ektimo Pty Ltd, ABN 86 600 381 413

Report Authorisation

Scott Woods
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NATA Accredited Laboratory
No. 14601

Steven Cooper
Ektimo Signatory

Accredited for compliance with ISO/IEC 17025 - Testing. NATA is a signatory to the ILAC mutual recognition arrangement for the mutual recognition of the equivalence of testing, calibration and inspection reports.

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Table of Contents

1 Executive Summary

1.1 Background

Ektimo was engaged by Veolia Environmental Services (Australia) Pty Ltd to perform emission testing at their Tarago plant. Testing was carried out in accordance with Environment Protection Licence 11436.

1.2 Project Objective

The objective of the project was to quantify emissions from 3 discharge points to determine compliance with Veolia Environmental Services (Australia) Pty Ltd's Environmental Licence.

Monitoring was performed as follows:

Location		Test Parameters*
EPA 8 – Engine 2 Exhaust Stack	14 December 2021	Hydrogen sulfide Sulfuric acid mist and sulfur trioxide (as SO_3) Nitrogen oxides, carbon monoxide, sulfur dioxide, carbon dioxide, oxygen Volatile organic compounds (VOCs) Destruction efficiency
EPA 5 – LFG Supply	14 December 2021	Carbon dioxide, oxygen Volatile organic compounds (VOCs)
EPA 7 – Flare 1	14 December 2021	Hydrogen sulfide

* Flow rate, velocity, temperature, molecular weight, dry gas density and moisture were also determined at EPA 8.

All results are reported on a dry basis at STP.

At EPA 5 (LFG Supply) temperature and flowrate parameters were supplied by Veolia personnel.

At EPA 7 (Flare 1) temperature and flowrate parameters were unable to be tested as it was not safe to do so.

Plant operating conditions have been noted in the report.

1.3 Licence Comparison

The following licence comparison table shows that all analytes highlighted in green are within the licence limit set by the NSW EPA as per licence 11436 (last amended on 21 September 2021).

EPA No.	Location Description	Pollutant	Units	Licence Limit	Detected Values	Detected values (corrected to 7% O_2)
8	Engine 2 Exhaust Stack	Hydrogen Sulfide	mg/m^3	5	<0.7	**<0.8**
		Sulfuric acid mist and sulfur trioxide (as SO_3)	mg/m^3	100	0.87	**0.96**
		Nitrogen Oxides	mg/m^3	450	290	**320**
		Volatile organic compound destruction efficiency	%	≥ 98	**99.6**	-

Please note that the measurement uncertainty associated with the test results was not considered when determining whether the results were compliant or non-compliant.

Refer to the Test Methods table for the measurement uncertainties.

2 Sampling Plane Compliance

Ektimo assessed the engine exhaust stack sampling plane criteria and selection of sampling points outlined in NSW TM-1 (Australian Standard 4323.1 -1995). In this method, the selection of sampling plane position calls for an Ideal sampling plane to be located in a straight, preferably vertical section of stack or duct away from any flow obstructions which may cause a disturbance or other instability to the gas flow. This position will be found to exist at 7-8 hydraulic diameters downstream and 2-3 hydraulic diameters upstream from a flow disturbance. In the case of the EPA point 8 engine exhaust stack, the sampling plane is located 4 hydraulic diameters downstream of a junction and 2 hydraulic diameters from the exit. See table 1 for details.

TABLE 1

CRITERIA FOR SELECTION OF SAMPLING PLANES

Type of flow disturbance	Minimum distance upstream from disturbance, diameters (*D*)	Minimum distance downstream from disturbance, diameters (*D*)
Bend, connection, junction, direction change	>2*D*	>6*D*
Louvre, butterfly damper (partially closed or closed)	>3*D*	>6*D*
Axial fan	>3*D*	>8*D* (see Note)
Centrifugal fan	>3*D*	>6*D*

NOTE: The plane should be selected as far as practicable from a fan. Flow straighteners may be required to ensure the position chosen meets the check criteria listed in Items (a) to (f) below.

In addition the following criteria must be met.

a) The gas velocity is basically in the same direction at all points along each sampling traverse.

b) The gas velocity at all sampling points is greater than 3 m/s.

c) The gas flow profile at the sampling plane shall be steady, evenly distributed and not have a cyclonic component which exceeds an angle of 15° to the duct axis, when measured near the periphery of a circular sampling plane

d) The temperature difference between adjacent points of the survey along each sampling traverse is less than 10% of the absolute temperature, and the temperature at any point differs by less than 10% from the mean.

e) The ratio of the highest to lowest pitot pressure difference shall not exceed 9:1 and the ratio of highest to lowest gas velocities shall not exceed 3:1. For isokinetic testing the use of impingers, the gas velocity ratio across the sampling plane should not exceed 1.6:1

f) The gas temperature at the sampling plane should preferably be above the dewpoint.

If the criteria of items (a) to (f) cannot be achieved a new sampling position shall be selected. The EPA point 8 engine exhaust stack meets all criteria of (a) to (f) and is suitable, therefore a new sampling position is not required, although an increased number of sampling points shall be used in accordance with clause 4.2 (non-ideal sampling positions) of AS 4323.1-1995.

Clause 4.2 proposes that if the criteria of table 1 cannot be met then a greater number of points shall be used in order to retain as much accuracy as is practicable, by applying the appropriate sampling point factors from *table 2*. The product of both the upstream and downstream factors multiplied by the total number of sampling points from *table 3* should then be raised to the next even number of sampling points for each sampling traverse.

TABLE 2

SAMPLING POINT FACTORS

Non-ideal situation	Sampling point factors
Sampling plane downstream from disturbance:	
Diameters less than Table 1	
0	1.00
1	1.05
2	1.10
3	1.15
4 or more	1.20
Sampling plane upstream from disturbance:	
Diameters less than Table 1	
0	1.00
0.5	1.05
1.0	1.10
1.5 or more	1.15

TABLE 3

MINIMUM NUMBER OF SAMPLING POINTS FOR CIRCULAR SAMPLING PLANES

Sampling plane diameter m	Minimum number of sampling traverses	Minimum number of access holes	Minimum number of sampling points per radius	Minimum total number of sampling points
>0.20 ≤0.35	2	2	1	4
>0.35 ≤0.70	2	2	2	8
>0.70 ≤1.50	2	2	3	12
>1.50 ≤2.50	2	4	4	16
>2.50 ≤4.00	2	4	6	24
>4.00 ≤6.00	3	6	5	30
>6.00	3	6	6	36

By example, the EPA point 8 engine exhaust stack has a sampling plane diameter of 350mm. If an ideal sampling plane was available the total number of sampling points would equate to 4. For this location, we have used a sampling point factor of 1.10 which yields a total number of sampling points of 8.

3 Results

3.1 EPA 8 – Engine 2 Exhaust Stack

Date	14/12/2021	**Client**	Veolia Environmental Services (Australia) Pty Ltd
Report	R011837	**Stack ID**	EPA 8 - Engine 2
Licence No.	11436	**Location**	Tarago
Ektimo Staff	Scott Woods and Steven Cooper	**State**	NSW
Process Conditions	Engine Load: 954kW		*211203*

Sampling Plane Details		
Sampling plane dimensions	350 mm	
Sampling plane area	0.0962 m²	
Sampling port size, number	4" Flange (x2)	
Access & height of ports	Elevated work platform	10 m
Duct orientation & shape	Vertical	Circular
Downstream disturbance	Exit	2 D
Upstream disturbance	Junction	4 D
No. traverses & points sampled	2	8
Sample plane compliance to AS4323.1 (1995)	Compliant but non-ideal	

The sampling plane is deemed to be non-ideal due to the following reasons:
The sampling plane is too near to the upstream disturbance but is greater than or equal to 2D

Stack Parameters		
Moisture content, %v/v	12	
Gas molecular weight, g/g mole	29.0 (wet)	30.4 (dry)
Gas density at STP, kg/m³	1.29 (wet)	1.36 (dry)
Gas density at discharge conditions, kg/m³	0.45	
% Oxygen correction & Factor	7 %	1.11
Gas Flow Parameters		
Flow measurement time(s) (hhmm)	1105 & 1323	
Temperature, °C	446	
Temperature, K	719	
Velocity at sampling plane, m/s	44	
Volumetric flow rate, actual, m³/s	4.2	
Volumetric flow rate, actual, m³/h	15000	
Volumetric flow rate, actual, m³/s	4.2	
Volumetric flow rate (wet STP), m³/h	15000	
Volumetric flow rate (wet STP), m³/s	1.5	
Volumetric flow rate (wet STP), m³/h	5400	
Volumetric flow rate (dry STP), m³/s	1.3	
Volumetric flow rate (dry STP), m³/h	4700	
Mass flow rate (wet basis), kg/hour	6800	
Velocity difference, %	<1	

Date	14/12/2021	**Client**	Veolia Environmental Services (Australia) Pty Ltd
Report	R011837	**Stack ID**	EPA 8 - Engine 2
Licence No.	11436	**Location**	Tarago
Ektimo Staff	Scott Woods and Steven Cooper	**State**	NSW
Process Conditions	Engine Load: 954kW		211203

Gas Analyser Results	Average			Minimum			Maximum		
Sampling time	1110 - 1210			1110 - 1210			1110 - 1210		
	Concentration mg/m³	Corrected to 7% O2 mg/m³	Mass Rate g/min	Concentration mg/m³	Corrected to 7% O2 mg/m³	Mass Rate g/min	Concentration mg/m³	Corrected to 7% O2 mg/m³	Mass Rate g/min
Combustion Gases									
Nitrogen oxides (as NO_2)	290	320	23	270	300	21	310	340	24
Sulfur dioxide	680		53	370		29	730		57
Carbon monoxide	870		68	850		66	890		70
	Concentration %v/v			Concentration %v/v			Concentration %v/v		
Carbon dioxide	12.1			12			12.1		
Oxygen	8.3			8.2			8.5		
Sampling time	1201-1309			1201 - 1309			1201-1309		
	Concentration mg/m³		Mass Rate g/min	Concentration mg/m³		Mass Rate g/min	Concentration mg/m³		Mass Rate g/min
Total Organic Compounds (TOC)									
VOC (as n-propane)	36		2.8	<4		<0.3	130		11

Hydrogen Sulfide	Results		
Sampling time	1115-1215		
	Concentration mg/m³	Corrected to 7% O2 mg/m³	Mass Rate g/min
Hydrogen Sulfide	<0.7	<0.8	<0.05

Isokinetic Results	Results		
Sampling time	1115-1222		
	Concentration mg/m³	Corrected to 7% O2 mg/m³	Mass Rate g/min
Sulfur trioxide and/or Sulfuric acid (as SO_3)	0.87	0.96	0.068
Isokinetic Sampling Parameters			
Sampling time, min		64	
Isokinetic rate, %		101	
Velocity difference, %		<1	

Testing Parameter	Total Hydrocarbons (g/min)		
	LFG Inlet	Stack Outlet	Destruction Efficiency %
EPA Point 8 (Engine 2) Stack	770	2.8	99.6

3.2 EPA 5 – LFG Supply

Date	14/12/2021	**Client**	Veolia Environmental Services (Australia) Pty Ltd
Report	R11837	**Stack ID**	EPA 5 - LFG Supply
Licence No.	11436	**Location**	Tarago
Ektimo Staff	Scott Woods and Steven Cooper	**State**	NSW
Process Conditions	5 Engines in operation		*211203*

Sampling Plane Details		
Sampling plane dimensions	370 mm	
Sampling plane area	0.108 m²	
Sampling port size, number	1" BSP (x1)	
Access & height of ports	Ground level 1.5 m	
Duct orientation & shape	Horizontal Circular	
Downstream disturbance	Change in diameter 2.2 D	
Upstream disturbance	Connection 1.3 D	
No. traverses & points sampled	1 1	
Comments		
Temperature and flow data supplied by Veolia personnel		

Stack Parameters		
Moisture content, %v/v	0.63	
Gas molecular weight, g/g mole	34.0 (wet)	34.1 (dry)
Gas density at STP, kg/m³	1.52 (wet)	1.52 (dry)
Gas density at discharge conditions, kg/m³	1.63	
Gas Flow Parameters		
Temperature, °C	4	
Temperature, K	277	
Velocity at sampling plane, m/s	6.7	
Volumetric flow rate, actual, m³/s	0.72	
Volumetric flow rate, actual, m³/h	2600	
Volumetric flow rate (wet STP), m³/s	0.77	
Volumetric flow rate (wet STP), m³/h	2800	
Volumetric flow rate (dry STP), m³/s	0.77	
Volumetric flow rate (dry STP), m³/h	2800	
Mass flow rate (wet basis), kg/hour	4200	

Gas Analyser Results	Average	
Sampling time	1210 - 1310	
	Concentration % v/v	
Carbon dioxide	36.6	
Oxygen	3.4	
Sampling time	1202 - 1310	
	Concentration mg/m³	Mass Rate g/min
Total Organic Compounds (TOC)		
VOC (as n-propane)	17000	770

3.3 EPA 7 – Flare 1

Date	14/12/2021	**Client**	Veolia Environmental Services (Australia) Pty Ltd
Report	R011837	**Stack ID**	EPA 7 - Flare 1
Licence No.	11436	**Location**	Tarago
Ektimo Staff	Scott Woods and Steven Cooper	**State**	NSW
Process Conditions	Please refer to client records.		

Hydrogen Sulfide	Results
Sampling time	1558-1658
	Concentration mg/m³
Hydrogen sulfide	<0.6

4 Plant Operating Conditions

On the day of sampling the Engine Load was 954kW

See Veolia Environmental Services (Australia) Pty Ltd's records for complete process conditions.

5 Test Methods

All sampling and analysis performed by Ektimo unless otherwise specified. Specific details of the methods are available upon request.

Parameter	Sampling Method	Analysis Method	Uncertainty*	NATA Accredited	
				Sampling	Analysis
Sampling points - Selection	NSW EPA TM-1	NA	NA	✓	NA
Flow rate, temperature and velocity	NSW EPA TM-2	NSW EPA TM-2	8%, 2%, 7%	NA	✓
Moisture content	NSW EPA TM-22	NSW EPA TM-22	19%	✓	✓
Carbon dioxide	NSW EPA TM-24	NSW EPA TM-24	13%	✓	✓
Carbon monoxide	NSW EPA TM-32	NSW EPA TM-32	12%	✓	✓
Nitrogen oxides	NSW EPA TM-11	NSW EPA TM-11	12%	✓	✓
Oxygen	NSW EPA TM-25	NSW EPA TM-25	13%	✓	✓
Sulfur dioxide	NSW EPA TM-4	NSW EPA TM-4	12%	✓	✓
Volatile organic compounds	NSW EPA TM-34	NSW EPA TM-34	not specified	✓	✓
Hydrogen sulfide	NSW EPA TM-5	NSW EPA TM-5	not specified	✓	✓†
Sulfuric acid mist and/or sulfur trioxide	NSW EPA TM-3	Ektimo 235	16%	✓	✓†

220110

* Uncertainties cited in this table are estimated using typical values and are calculated at the 95% confidence level (coverage factor = 2).

† Analysis conducted at the Ektimo Mitcham, VIC laboratory, NATA accreditation number 14601. Results were reported on
22 December 2021 in report R011837 – H_2S (Method 11).
5 January 2022 in report LV-002353.

6 Quality Assurance/Quality Control Information

Ektimo is accredited by the National Association of Testing Authorities (NATA) for the sampling and analysis of air pollutants from industrial sources. Unless otherwise stated test methods used are accredited with the National Association of Testing Authorities. For full details, search for Ektimo at NATA's website www.nata.com.au.

Ektimo is accredited by NATA (National Association of Testing Authorities) to ISO/IEC 17025 - Testing. ISO/IEC 17025 - Testing requires that a laboratory have adequate equipment to perform the testing, as well as laboratory personnel with the competence to perform the testing. This quality assurance system is administered and maintained by the Quality Director.

NATA is a member of APAC (Asia Pacific Accreditation Co-operation) and of ILAC (International Laboratory Accreditation Co-operation). Through mutual recognition arrangements with these organisations, NATA accreditation is recognised worldwide.

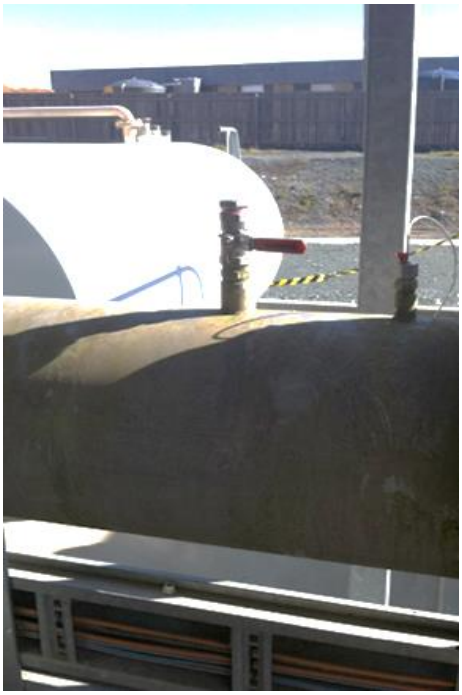
7 Definitions

The following symbols and abbreviations may be used in this test report:

% v/v	Volume to volume ratio, dry or wet basis
~	Approximately
<	Less than
>	Greater than
≥	Greater than or equal to
APHA	American Public Health Association, Standard Methods for the Examination of Water and Waste Water
AS	Australian Standard
BSP	British standard pipe
CARB	Californian Air Resources Board
CEM/CEMS	Continuous Emission Monitoring/Continuous Emission Monitoring System
CTM	Conditional test method
D	Duct diameter or equivalent duct diameter for rectangular ducts
D_{50}	'Cut size' of a cyclone is defined as the particle diameter at which the cyclone achieves a 50% collection efficiency i.e. half of the particles are retained by the cyclone and half pass through it. The D_{50} method simplifies the capture efficiency distribution by assuming that a given cyclone stage captures all of the particles with a diameter equal to or greater than the D_{50} of that cyclone and less than the D_{50} of the preceding cyclone.
DECC	Department of Environment & Climate Change (NSW)
Disturbance	A flow obstruction or instability in the direction of the flow which may impede accurate flow determination. This includes centrifugal fans, axial fans, partially closed or closed dampers, louvres, bends, connections, junctions, direction changes or changes in pipe diameter.
DWER	Department of Water and Environmental Regulation (WA)
DEHP	Department of Environment and Heritage Protection (QLD)
EPA	Environment Protection Authority
FTIR	Fourier Transform Infra-red
ISC	Intersociety Committee, Methods of Air Sampling and Analysis
ISO	International Organisation for Standardisation
ITE	Individual threshold estimate
Lower bound	When an analyte is not present above the detection limit, the result is assumed to be equal to zero.
Medium bound	When an analyte is not present above the detection limit, the result is assumed to be equal to half of the detection limit.
NA	Not applicable
NATA	National Association of Testing Authorities
NIOSH	National Institute of Occupational Safety and Health
NT	Not tested or results not required
OM	Other approved method
OU	Odour unit. One OU is that concentration of odorant(s) at standard conditions that elicits a physiological response from a panel equivalent to that elicited by one Reference Odour Mass (ROM), evaporated in one cubic metre of neutral gas at standard conditions.
PM_{10}	Atmospheric suspended particulate matter having an equivalent aerodynamic diameter of less than approximately 10 microns (µm).
$PM_{2.5}$	Atmospheric suspended particulate matter having an equivalent aerodynamic diameter of less than approximately 2.5 microns (µm).
PSA	Particle size analysis. PSA provides a distribution of geometric diameters, for a given sample, determined using laser diffraction.
RATA	Relative accuracy test audit
Semi-quantified VOCs	Unknown VOCs (those not matching a standard compound), are identified by matching the mass spectrum of the chromatographic peak to the NIST Standard Reference Database (version 14.0), with a match quality exceeding 70%. An estimated concentration is determined by matching the area of the peak with the nearest suitable compound in the analytical calibration standard mixture.
STP	Standard temperature and pressure. Gas volumes and concentrations are expressed on a dry basis at 0°C, at discharge oxygen concentration and an absolute pressure of 101.325 kPa, unless otherwise specified.
TM	Test method
TOC	The sum of all compounds of carbon which contain at least one carbon-to-carbon bond, plus methane and its derivatives.
USEPA	United States Environmental Protection Agency
VDI	Verein Deutscher Ingenieure (Association of German Engineers)
Velocity difference	The percentage difference between the average of initial flows and after flows.
Vic EPA	Victorian Environment Protection Authority
VOC	Volatile organic compound. A carbon-based chemical compound with a vapour pressure of at least 0.010 kPa at 25°C or having a corresponding volatility under the given conditions of use. VOCs may contain oxygen, nitrogen and other elements. VOCs do not include carbon monoxide, carbon dioxide, carbonic acid, metallic carbides and carbonate salts.
XRD	X-ray diffractometry
Upper bound	When an analyte is not present above the detection limit, the result is assumed to be equal to the detection limit.
95% confidence interval	Range of values that contains the true result with 95% certainty. This means there is a 5% risk that the true result is outside this range.

8 Appendix 1: Site Location Photos

EPA Point 8 - Engine 2 Exhaust Stack



EPA Point 5 - LFG Supply

EPA 7 – Flare 1

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EVAPORATION DATA SUPPLIED BY VEOLIA:

MAY 2007 – JUNE 2012

Evaporation	2006								2006				2007					
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1	6.40	5.40	4.10	2.60	1.70	1.10	1.20	1.90	2.80	3.90	5.00	6.20	5.60	6.80	5.00	3.00	1.50	1.41
2	6.40	5.40	4.10	2.60	1.70	1.10	1.20	1.90	2.80	3.90	5.00	6.20	2.20	2.60	4.80	3.60	2.40	1.04
3	6.40	5.40	4.10	2.60	1.70	1.10	1.20	1.90	2.80	3.90	5.00	6.20	2.60	5.00	3.80	3.80	3.19	1.16
4	6.40	5.40	4.10	2.60	1.70	1.10	1.20	1.90	2.80	3.90	5.00	6.20	5.00	6.40	7.60	2.80	4.52	1.30
5	6.40	5.40	4.10	2.60	1.70	1.10	1.20	1.90	2.80	3.90	5.00	6.20	6.80	7.40	6.60	3.00	2.68	0.69
6	6.40	5.40	4.10	2.60	1.70	1.10	1.20	1.90	2.80	3.90	5.00	6.20	7.20	8.20	3.60	4.60	2.52	1.00
7	6.40	5.40	4.10	2.60	1.70	1.10	1.20	1.90	2.80	3.90	5.00	6.20	8.60	7.00	5.00	2.40	2.43	0.67
8	6.40	5.40	4.10	2.60	1.70	1.10	1.20	1.90	2.80	3.90	5.00	6.20	5.80	4.60	3.60	1.40	1.87	0.83
9	6.40	5.40	4.10	2.60	1.70	1.10	1.20	1.90	2.80	3.90	5.00	6.20	6.60	6.80	5.00	2.40	1.37	0.48
10	6.40	5.40	4.10	2.60	1.70	1.10	1.20	1.90	2.80	3.90	5.00	6.20	7.40	5.20	4.80	2.00	1.41	0.73
11	6.40	5.40	4.10	2.60	1.70	1.10	1.20	1.90	2.80	3.90	5.00	6.20	8.60	3.60	5.40	3.20	1.48	1.24
12	6.40	5.40	4.10	2.60	1.70	1.10	1.20	1.90	2.80	3.90	5.00	6.20	11.40	2.20	7.00	3.60	1.74	0.77
13	6.40	5.40	4.10	2.60	1.70	1.10	1.20	1.90	2.80	3.90	5.00	6.20	13.40	3.80	3.60	2.60	2.19	1.23
14	6.40	5.40	4.10	2.60	1.70	1.10	1.20	1.90	2.80	3.90	5.00	6.20	8.40	4.40	2.80	3.00	1.51	1.02
15	6.40	5.40	4.10	2.60	1.70	1.10	1.20	1.90	2.80	3.90	5.00	6.20	7.80	5.80	4.80	3.60	2.03	0.43
16	6.40	5.40	4.10	2.60	1.70	1.10	1.20	1.90	2.80	3.90	5.00	6.20	8.40	6.20	6.20	4.00	2.09	0.64
17	6.40	5.40	4.10	2.60	1.70	1.10	1.20	1.90	2.80	3.90	5.00	6.20	8.80	3.80	4.60	2.80	1.47	0.84
18	6.40	5.40	4.10	2.60	1.70	1.10	1.20	1.90	2.80	3.90	5.00	6.20	7.20	5.60	2.40	3.40	1.49	0.75
19	6.40	5.40	4.10	2.60	1.70	1.10	1.20	1.90	2.80	3.90	5.00	6.20	6.00	1.60	2.00	3.80	0.72	0.63
20	6.40	5.40	4.10	2.60	1.70	1.10	1.20	1.90	2.80	3.90	5.00	6.20	7.60	3.60	0.20	2.20	1.53	0.43
21	6.40	5.40	4.10	2.60	1.70	1.10	1.20	1.90	2.80	3.90	5.00	6.20	11.00	6.80	2.20	2.60	2.14	1.13
22	6.40	5.40	4.10	2.60	1.70	1.10	1.20	1.90	2.80	3.90	5.00	6.20	8.40	7.40	3.40	2.60	2.21	1.12
23	6.40	5.40	4.10	2.60	1.70	1.10	1.20	1.90	2.80	3.90	5.00	6.20	7.60	5.60	4.40	2.60	1.69	1.35
24	6.40	5.40	4.10	2.60	1.70	1.10	1.20	1.90	2.80	3.90	5.00	6.20	9.40	5.20	4.80	1.80	1.59	1.11
25	6.40	5.40	4.10	2.60	1.70	1.10	1.20	1.90	2.80	3.90	5.00	6.20	7.20	4.60	4.00	0.60	1.81	1.16
26	6.40	5.40	4.10	2.60	1.70	1.10	1.20	1.90	2.80	3.90	5.00	6.20	8.00	4.20	2.60	1.20	1.75	0.57
27	6.40	5.40	4.10	2.60	1.70	1.10	1.20	1.90	2.80	3.90	5.00	6.20	12.40	3.60	2.80	2.40	1.56	0.27
28	6.40	5.40	4.10	2.60	1.70	1.10	1.20	1.90	2.80	3.90	5.00	6.20	10.60	3.00	2.80	1.40	2.20	0.42
29	8.20		4.10	2.60	1.70	1.10	1.20	1.90	2.80	3.90	5.00	6.20	8.80		4.20	1.40	1.75	0.79
30	8.20		4.10	2.60	1.70	1.10	1.20	1.90	2.80	3.90	5.00	6.20	8.00		3.00	1.80	2.65	1.27
31	8.20		4.10		1.70		1.20	1.90		3.90		6.20	10.00		3.40		1.24	
Total Month	**203.8**	**151.2**	**127.1**	**78**	**52.7**	**33**	**37.2**	**58.9**	**84**	**120.9**	**150**	**192.2**	**246.8**	**141**	**126.4**	**79.6**	**60.68**	**26.47**
Accumulated Year	**204**	**355**	**482.1**	**560.1**	**612.8**	**645.8**	**683**	**741.9**	**825.9**	**946.8**	**1096.8**	**1289**	**246.8**	**387.8**	**514.2**	**593.8**	**654.48**	**681**

Evaporation data recorded from the Goulburn Tafe W

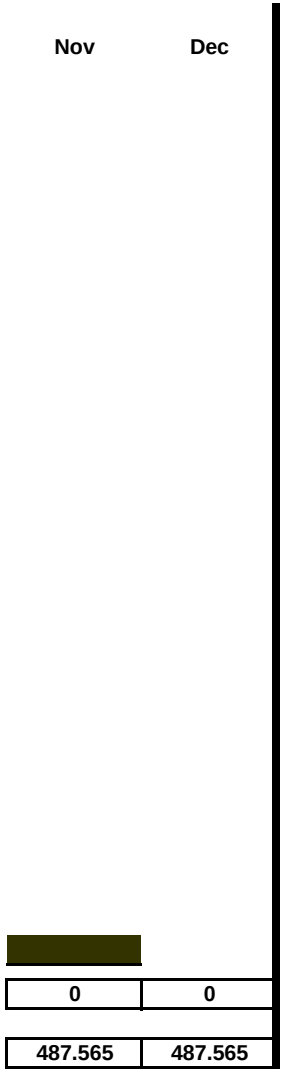
						2008												2009	
Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
1.21	1.13	4.17	4.49	2.73	2.82	7.058	4.079	4.42	3.876	2.082	1.889	2.563	2.158	1.339	3.822	8.25	5.487	6.915	7.353
0.82	1.27	2.87	5.04	4.66	2.286	7.126	2.908	4.566	3.485	1.918	0.485	1.146	0.953	2.667	4.838	2.408	7.579	8.11	6.754
1.21	2.29	3.26	5.41	4.31	5.675	7.446	4.000	4.257	5.316	1.977	0.828	1.139	1.469	2.828	6.486	3.711	6.729	6.339	6.712
1.75	0.94	2.94	8.39	1.49	4.147	2.006	4.788	4.536	2.663	2.314	0.46	1.32	1.967	1.616	6.588	3.963	6.955	5.254	5.055
1.18	1.59	2.46	5.05	3.30	4.956	7.4	1.496	4.274	3.13	2.225	0.771	0.847	1.659	1.006	1.318	5.035	5.046	6.369	4.618
0.72	1.67	1.44	5.48	2.40	1.109	6.6	1.512	4.457	3.239	2.423	0.76	1.387	1.263	1.288	2.328	3.928	5.442	8.86	6.982
1.06	1.65	1.87	5.68	4.5	4.2	6.883	4.498	5.111	2.656	2.177	1.026	1.22	1.656	1.162	3.205	6.31	7.507	8.46	7.344
1.02	1.71	1.38	3.90	2.097	3.395	6.251	3.381	3.829	2.231	2.323	1.351	1.312	1.147	2.65	3.387	3.199	6.765	8.21	8.81
0.70	2.11	1.61	3.89	2.106	4.31	6.6	2.689	4.053	1.712	2.209	0.5	1.227	1.663	2.508	4.196	3.801	6.172	3.146	8.3
0.90	2.39	2.04	3.91	2.929	6.974	5.175	2.861	4.623	1.81	2.056	1.211	0.51	1.35	3.038	4.017	5.71	6.895	4.802	2.73
1.19	3.15	2.55	4.12	4.648	3.645	6.945	4.415	4.768	2.685	2.026	0.588	0.875	0.664	2.896	4.264	5.541	3.662	4.78	1.038
1.44	3.09	1.69	4.89	5.543	1.426	7.747	4.853	4.954	3.052	1.296	0.865	1.079	1.452	3.56	3.963	5.464	1.874	4.981	4.292
1.09	2.27	2.29	3.87	5.421	5.00	5.179	3	4.862	2.614	1.532	1.672	1.215	1.511	4.341	4.769	6.244	0.951	4.415	1.801
1.02	1.69	3.53	4.15	6.033	4.40	7.447	1.161	4.992	2.11	1.757	1.089	1.621	1.801	5.149	4.463	6.274	4.303	6.69	3.05
0.86	1.02	4.08	4.78	6.794	5.362	1.344	3.54	4.861	2.854	1.874	1.572	2.064	1.693	2.177	1.793	6.243	3.726	9	2.4
1.06	1.08	3.46	6.31	6.455	5.385	6.369	5.299	5.892	2.901	1.997	1.141	1.281	1.726	4.05	3.63	6.192	5.567	9.69	2.225
1.04	1.87	3.82	7.67	5.901	0.933	4.194	5.042	4.894	2.611	1.468	0.794	1.247	1.834	2.663	4.097	4.685	6.225	7.435	3.11
1.34	0.82	2.25	4.52	6.297	4.659	4.4	4.186	4.841	1.902	1.245	1.042	1.28	2.186	2.098	4.755	5.378	3.919	6.079	2.313
1.30	0.95	3.21	4.95	5.31	4.40	2.054	4.73	5.056	2.09	1.432	1.056	1.051	1.361	3.326	4.845	3.55	4.689	6.418	3.187
1.52	0.78	4.30	5.30	6.444	2.116	1.72	4.48	2.672	1.27	1.881	0.842	1.652	2.009	4.809	5.672	2.603	5.48	7.43	5.529
1.49	0.94	1.92	5.45	6.425	1.79	3.779	5.237	4.843	1.596	1.602	0.297	1.258	2.209	5.661	4.572	3.418	4.656	7.28	3.265
1.15	1.14	3.13	7.20	6.425	5.306	2.357	2.445	1.335	2.494	1.74	1.192	1.394	2.44	4.423	3.561	5.702	5.765	7.637	4.303
0.78	0.88	3.23	6.92	0.573	2.921	4.681	5.397	1.763	1.229	1.673	1.271	1.551	1.138	4.422	3.28	2.389	6.683	5.991	3.535
1.51	1.16	3.62	4.15	1.268	4.309	5.547	6.058	3.212	2.211	1.193	1.118	1.17	1.594	2.527	3.602	2.16	3.337	6.481	4.391
1.60	1.70	4.87	1.97	2.786	4.859	6.208	5.649	1.777	1.685	1.456	1.126	1.146	2.284	2.461	4.178	5.332	1.37	7.481	6.763
1.99	2.03	4.68	1.29	5.691	5.20	4.636	4.078	0.872	1.569	1.499	1.623	1.547	2.553	3.68	5.96	4.286	6.181	4.449	5.653
1.86	2.98	3.07	2.36	4.37	6.216	6.022	5.26	2.734	3.338	1.253	1.242	1.2	2.669	4.221	5.949	3.299	7.006	6.364	5.124
1.30	3.73	3.92	4.32	6.6	3.844	6.413	3.85	3.058	2.642	1.484	1.607	0.866	2.212	5.675	8	5.683	4.365	4.688	4.802
1.73	4.86	5.73	4.75	5.35	6.515	5.972	0.894	2.139	1.338	1.37	1.198	1.235	1.744	6.15	5.297	3.178	5.461	6.868	[redacted]
1.18	3.51	3.62	5.87	3.106	6.941	6.752	[redacted]	3.646	2.208	1.425	1.927	1.503	1.283	3.495	1.819	5.458	7.121	7.29	[redacted]
1.56	3.98	[redacted]	5.56	[redacted]	7.736	6.868	[redacted]	3.861	[redacted]	1.726	[redacted]	1.703	2.13	[redacted]	5.019	[redacted]	6.405	7.182	[redacted]
38.56	**60.372**	**92.97**	**151.606**	**131.946**	**132.835**	**169.179**	**111.786**	**121.158**	**74.517**	**54.633**	**32.543**	**40.609**	**53.778**	**97.886**	**133.673**	**139.394**	**163.323**	**205.09**	**131.44**
719.5	**779.88**	**872.8**	**1024.45**	**1156.4**	**1289.23**	**169**	**280.965**	**402.123**	**476.64**	**531.273**	**563.816**	**604.425**	**658.203**	**756.089**	**889.762**	**1029.16**	**1192.48**	**205**	**336.533**

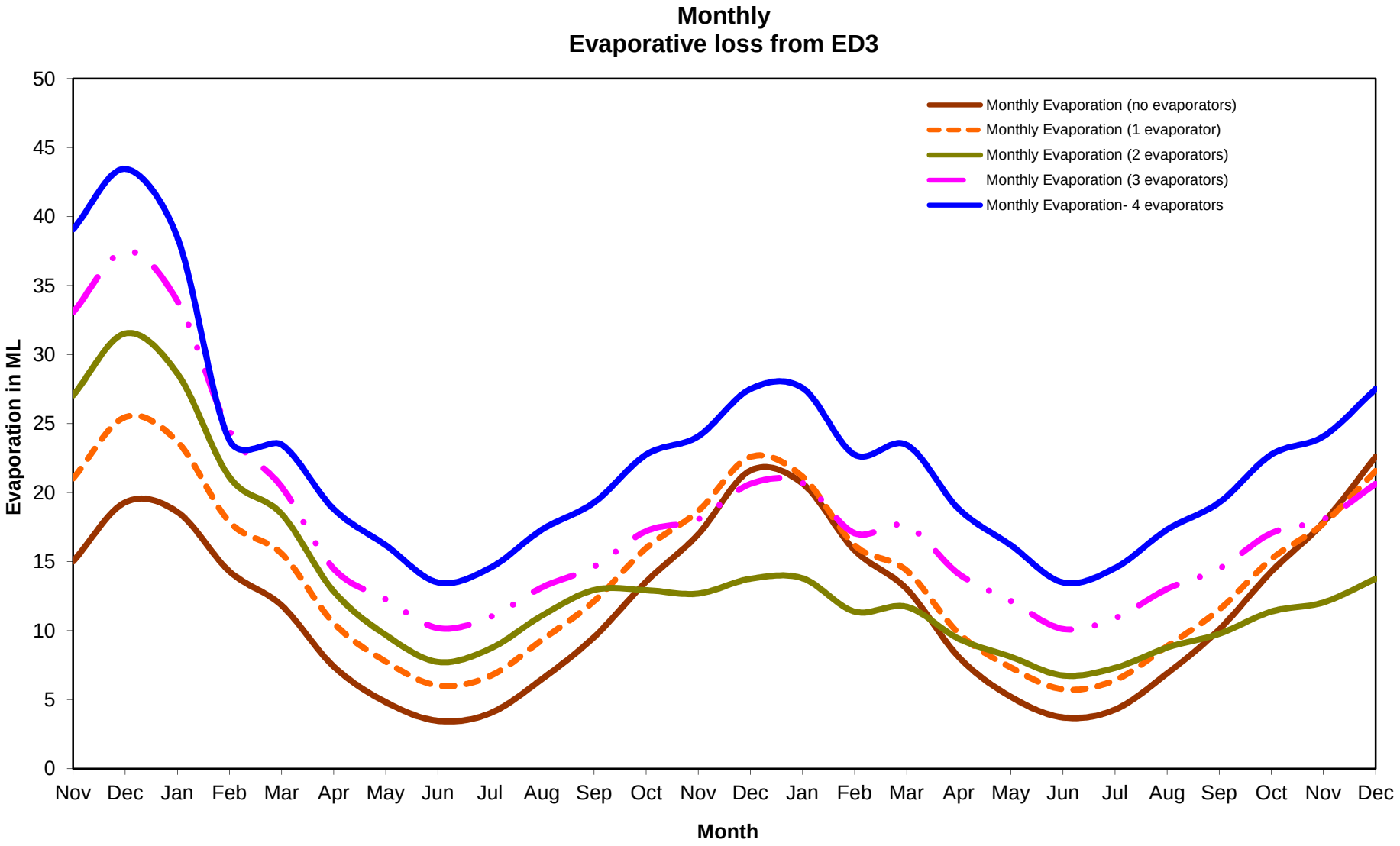
eather Station

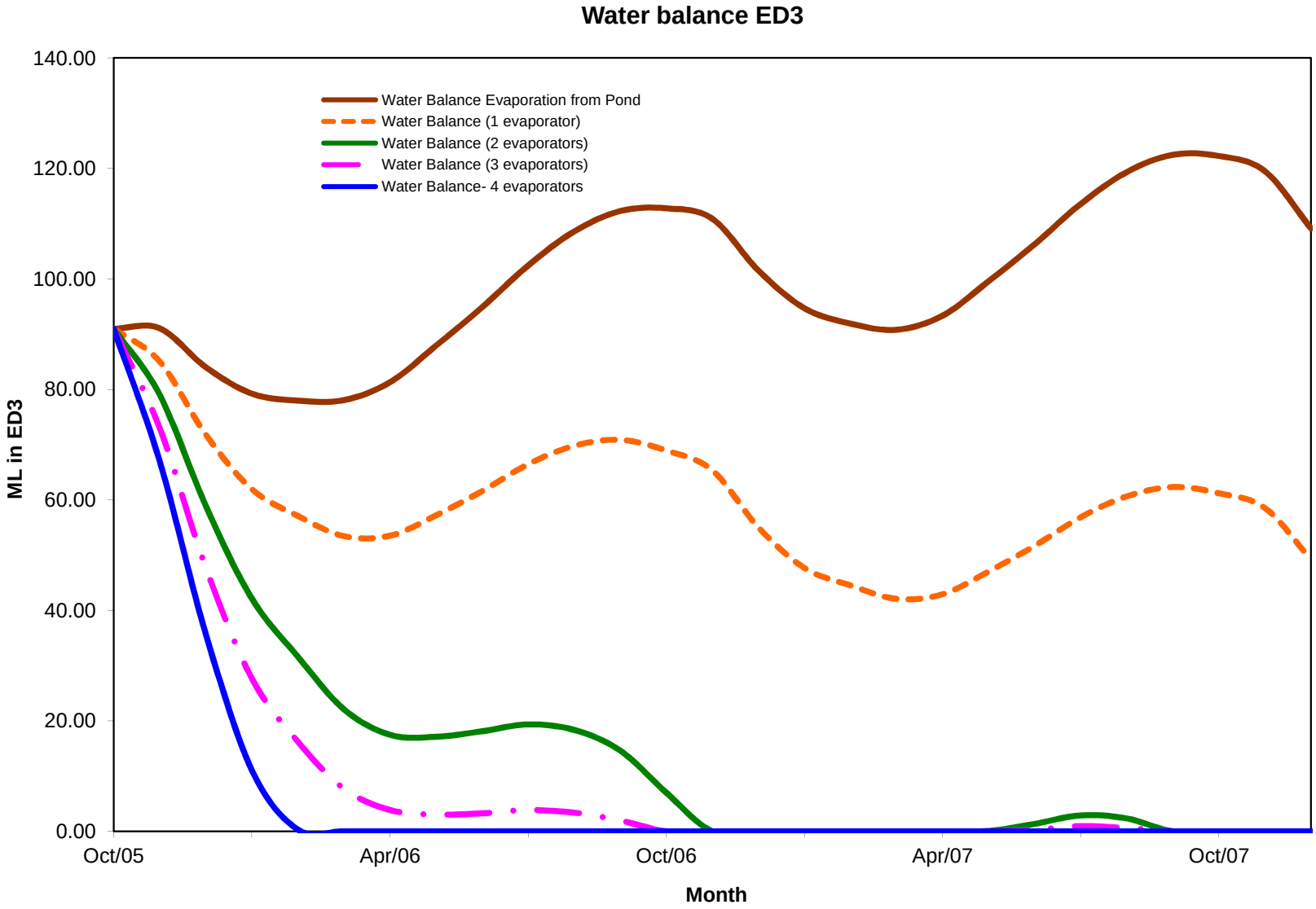
										2010					
Mar	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**
6.917	2.423	1.755	1.077	1.847	1.551	1.984	4.057	4.662	2.028	3.998	5.099	3.148	2.332	1.695	0.878
4.472	1.71	2.372	0.801	1.384	1.814	2.912	6.426	5.645	5.513	6.6	6.074	1.88	3.354	1.916	1.125
3.878	1.453	1.88	0.787	1.089	1.202	2.841	1.895	5.112	5.577	4.735	5.207	2.762	2.975	2.831	1.087
3.498	3.908	2.072	0.56	1.165	2.058	1.365	0.766	7.929	7.173	4.158	3.146	3.891	2.655	1.683	0.855
5.725	2.928	2.129	0.701	1.104	1.529	2.454	1.152	5.29	6.583	4.044	3.664	4.055	2.152	2.958	0.907
4.923	3.621	1.981	1.211	1.493	1.623	3.174	2.186	1.641	6.23	5.176	2.508	1.321	3.063	1.433	1.303
4.612	2.546	2.117	1.313	0.921	1.996	3.339	2.677	2.032	6.638	7.148	2.434	3.007	1.81	2.05	1.055
4.945	2.97	2.058	0.786	1.202	2.192	1.115	1.318	4.208	7.695	3.889	1.551	1.534	1.5	1.903	1.346
2.91	3.12	1.763	1.105	0.611	2.206	2.108	3.38	5.156	7.358	5.272	1.77	3.112	3.291	1.955	1.332
3.338	3.284	2.182	0.895	0.771	1.865	1.68	2.502	6.205	4.17	7.378	5.177	3.092	2.66	1.906	0.827
3.617	1.841	1.215	1.285	0.927	1.887	2.787	2.709	6.607	6.303	7.771	4.201	2.743	3.463	2.485	1.431
4.376	2.073	1.848	1.049	0.982	1.502	3.644	2.501	6.865	6.729	7.485	6.063	3.919	3.058	3.087	1.381
3.763	2.514	1.946	0.691	2.192	1.643	5.067	1.654	6.934	7.03	9.3	4.934	2.812	3.207	1.911	1.201
1.961	0.469	2.119	1.578	1.559	2.055	6.87	3.239	4.736	6.693	5.012	0.81	3.277	2.865	2.033	1.074
3.811	1.969	1.581	1.521	0.818	1.996	2.964	2.22	6.605	3.489	2.788	0.918	2.577	3.386	1.734	1.141
4.779	4.187	1.602	1.015	1.049	2.365	3.78	2.346	5.514	6.185	3.759	3.496	3.634	2.66	1.728	1.179
4.66	3.699	1.789	0.784	1.013	3.062	3.287	3.11	7.546	8	3.442	4.03	4.26	2.696	1.379	1.443
4.282	2.983	1.842	1.059	1.434	2.581	3.727	3.306	5.807	11.73	6.841	5.162	4.197	2.758	0.917	0.864
4.783	2.608	1.432	1.027	1.474	2.222	2.763	3.298	5.604	1.331	4.313	4.24	4.181	2.507	1.724	1.379
3.871	1.738	1.076	1.456	1.814	2.725	3.061	4.18	6.838	6.966	6.507	3.96	3.73	2.511	1.701	0.776
4.548	1.094	1.284	1.107	2.203	2.918	3.498	5.517	8	3.649	7.994	4.726	4.999	2.921	0.885	1.32
4.535	1.638	1.287	0.589	2.459	1.673	3.687	5.776	4.833	7.337	7.766	6.52	4.999	2.688	1.165	1.185
4.201	1.488	0.719	1.161	2.013	2.523	2.501	4.272	6.697	6.719	9.95	6.017	3.975	2.918	1.664	0.491
5.067	1.991	1.288	0.863	0.761	2.127	1.283	5.039	0.884	7.524	9.65	5.734	4.213	3.392	1.157	1.154
6.118	1.73	1.478	0.824	1.547	1.984	3.13	5.359	1.841	8.85	4.516	4.929	3.705	1.498	0.839	0.983
5.434	1.438	1.413	1.087	1.784	2.257	4.556	1.522	6.292	0.754	6.134	4.726	4.034	2.387	0.64	1.076
3.611	1.52	0.777	0.838	0.859	2.071	1.988	1.903	5.591	0.895	7.369	4.487	4.923	2.272	0.491	0.995
2.982	1.68	1.037	1.244	1.546	3.473	1.579	2.641	4.326	3.024	6.039	4.945	4.015	1.531	0.891	1.21
3.861	1.917	0.689	0.798	1.562	4.048	2.576	4.087	8.2	4.501	3.961	[redacted]	4.129	2.867	1.166	1.24
4.352	1.667	0.843	0.898	1.621	1.767	3.663	2.571	3.657	6.765	6.124	[redacted]	1.592	2.643	0.628	1.417
2.855	[redacted]	0.777	[redacted]	1.283	2.321	[redacted]	5.037	[redacted]	6.318	3.125	[redacted]	0.785	[redacted]	0.27	[redacted]
132.69	**68.21**	**48.35**	**30.11**	**42.49**	**67.24**	**89.38**	**98.65**	**161.26**	**179.76**	**182.24**	**116.53**	**104.50**	**80.02**	**48.83**	**33.66**
469.218	**537.425**	**585.776**	**615.886**	**658.373**	**725.609**	**814.992**	**913.638**	**1074.895**	**1254.652**	**182**	**298.77**	**403.27**	**483.29**	**532.12**	**565.77**

						2011							
Jul	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**
1.268	1.296	2.57	3.375	4.13	1.186	7.051	7.012	2.274	1.106	1.672	0.987	1.048	1.254
1.044	1.432	3.342	2.595	1.913	1.338	7.866	9.26	4.678	3.107	1.878	1.056	0.911	2.284
0.452	1.033	0.811	2.4	2.259	3.215	3.502	5.421	3.477	3.304	0.655	1.016	1.027	1.942
1.215	1.468	1.109	1.091	4.22	2.258	0.963	3.908	5.296	3.294	1.914	1.53	1.616	3.34
1.111	1.031	0.862	2.602	1.355	3.228	2.593	2.614	5.187	3.215	2.064	0.861	1.293	3.226
1.077	1.714	1.645	4.097	1.948	4.476	5.333	6.545	3.419	1.963	2.11	1.51	1.004	3.188
0.573	1.737	1.99	3.927	2.165	3.351	3.727	1.692	3.268	1.802	1.676	1.527	0.864	1.604
1.348	1.679	2.243	3.864	4.228	5.486	3.458	4.228	4.416	2.223	2.087	1.093	1.247	1.912
1.326	1.577	2.275	3.793	4.414	4.11	4.247	3.948	4.142	3.183	2.375	0.862	1.228	0.946
0.814	1.94	1.779	2.713	3.68	1.728	2.307	3.324	3.978	3.395	1.6	1.092	1.16	1.769
0.855	0.94	2.288	2.238	3.89	4.773	2.736	4.659	1.385	1.308	2.051	1.078	1.079	1.23
0.7	0.917	1.423	2.36	5.513	5.854	1.677	2.874	1.6	2.148	1.193	1.34	1.41	0.462
1.493	0.976	1.389	3.446	5.371	5.957	4.233	2.073	3.28	1.747	1.684	0.956	1.458	1.427
0.631	2.024	1.307	1.812	6.154	5.745	3.408	1.502	4.49	1.923	1.434	0.744	0.815	1.582
1.03	1.39	0.437	3.58	3.953	4.113	3.981	4.138	0.749	2.724	1.743	0.804	1.333	1.771
1.381	1.588	1.027	1.264	1.957	6.395	5.885	3.005	2.157	2.568	1.959	0.557	1.19	1.495
1.225	1.2	3.789	2.281	4.89	3.684	6.391	1.15	2.357	2.236	1.344	0.813	0.589	1.994
1.302	1.883	2.998	3.349	4.525	5.331	7.255	3.479	1.534	2.029	1.467	1.074	1.178	0.561
1.433	1.683	2.743	3.847	6.084	3.731	5.497	2.893	0.69	2.608	1.735	1.222	0.831	0.867
0.826	1.684	2.645	3.02	2.109	3.686	4.004	3.746	1.547	2.338	1.71	1.208	0.475	0.819
1.377	1.882	2.91	3.964	5.642	2.636	4.759	4.729	1.814	1.341	1.56	1.517	1.369	0.957
1.379	1.539	3.202	4.17	6.288	5.074	6.263	4.947	0.758	2.355	1.738	0.914	0.853	1.532
1.336	2.092	2.737	4.903	5.996	5.285	4.855	4.657	3.055	2.246	1.803	0.864	0.721	1.235
1.201	1.533	2.271	3.476	4.515	6.343	6.291	4.763	2.44	2.209	0.854	1.412	1.208	1.695
1.573	1.865	3.718	2.227	5.96	2.143	5.118	4.651	2.026	2.329	1.129	1.207	0.621	2.437
1.431	1.816	2.922	2.794	5.9	5.442	6.436	4.057	3.047	1.251	1.797	1.25	0.674	3.024
1.326	1.186	4.061	4.945	4.33	3.951	7.204	5.033	2.824	1.474	1.694	1.653	1.431	3.163
1.452	1.803	3.858	4.318	5.672	3.478	6.509	2.284	2.365	1.764	1.191	1.369	1.506	2.636
0.515	2.243	3.876	3.221	1.734	5.219	5.086	[redacted]	3.328	1.206	1.303	0.969	2.089	2.91
0.838	2.186	3.174	4.233	1.189	6.065	5.724	[redacted]	2.678	1.313	1.275	0.918	2.003	2.894
0.86	1.966	[redacted]	4.17	[redacted]	6.422	6.781	[redacted]	3.709	[redacted]	0.946	[redacted]	2.083	1.518
34.39	**49.30**	**71.40**	**100.08**	**121.98**	**131.70**	**151.14**	**112.592**	**87.968**	**65.709**	**49.641**	**33.403**	**36.314**	**57.674**
600.17	**649.47**	**720.87**	**820.94**	**942.93**	**1074.63**	**151.14**	**263.732**	**351.7**	**417.409**	**467.05**	**500.453**	**536.767**	**594.441**

				2012									
Sep	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**
2.471	2.435	4.777	2.325	5.891	5.284	0.9	3.54	1.227	1.373	1.384			
2.241	1.588	4.316	4.913	6.209	2.501	1.154	2.845	2.177	0.793	0.822			
2.59	1.69	3.187	3.823	6.572	0.926	0.938	2.605	1.285	0.278	1.289			
3.132	3.258	2.896	5.667	7.179	1.351	0.919	3.164	2.134	0.594	1.277			
3.208	3.717	5.035	2.502	3.869	5.308	1.289	2.861	1.909	1.126				
2.879	2.781	6.021	4.276	5.369	6.111	4.487	2.241	1.845	0.44				
3.472	1.184	5.481	2.521	4.112	3.608	2.485	3.182	1.434	1.351				
2.624	1.667	4.105	4.129	6.458	1.226	1.009	3.775	1.077	1.279				
2.148	2.349	3.484	1.996	2.415	1.754	1.291	3.02	2.012	1.112				
1.354	2.354	4.679	5.002	6.068	2.106	3.155	2.901	2.752	1.18				
2.113	3.671	3.949	4.417	5.436	4.055	4.215	2.367	3.317	1.241				
1.992	2.976	4.623	3.436	3.858	2.691	3.676	2.476	2.556	0.629				
3.06	3.96	5.283	2.506	5.435	3.405	1.858	2.471	2.095	0.589				
2.947	3.783	4.932	2.187	6.049	3.371	3.285	2.797	1.384	1.253				
3.867	2.61	7.31	4.185	2.996	4.062	2.97	1.622	1.75	1.101				
3.495	3.47	6.555	5.44	2.083	4.704	4.013	2.658	1.504	1.735				
4.641	4.797	1.852	2.785	4.367	5.012	3.449	2.979	1.687	0.388				
4.808	4.456	4.183	5.786	5.552	3.774	2.386	1.349	1.343	1.027				
5.481	4.215	5.886	3.902	6.141	3.874	3.566	1.094	1.883	1.354				
5.343	4.925	7.084	1.302	6.487	4.644	2.513	2.241	1.763	1.264				
2.999	5.604	2.288	4.018	4.825	2.77	3.803	2.089	0.999	1.125				
3.491	5.794	4.966	2.69	4.856	4.255	4.005	1.749	1.613	1.895				
4.132	4.353	1.416	4.248	4.142	3.313	1.574	1.236	2.124	0.979				
5.552	5.458	2.959	5.868	3.036	4.821	3.37	2.224	2.66	1.068				
0.677	6.477	1.808	6.049	4.872	5.508	3.169	1.13	1.581	1.355				
1.441	0.997	0.889	6.216	2.176	5.785	2.475	0.934	1.061	1.264				
2.871	1.547	4.708	2.701	3.709	2.374	3.162	1.885	0.925	0.88				
3.301	2.761	4.889	4.081	2.485	2.673	1.564	1.73	1.416	0.587				
1.057	4.003	5.752	4.757	4.831	1.274	1.226	2.061	0.983	1.278				
1.649	2.008	5.654	6.255	5.77	[redacted]	3.304	1.868	1.428	1.283				
[redacted]	4.498	[redacted]	3.977	2.548	[redacted]	3.262	[redacted]	1.146	[redacted]			[redacted]	
91.036	**105.386**	**130.967**	**123.96**	**145.796**	**102.54**	**80.472**	**69.094**	**53.07**	**31.821**	**4.772**	**0**	**0**	**0**
685.477	**790.863**	**921.83**	**1045.79**	**145.796**	**248.336**	**328.808**	**397.902**	**450.972**	**482.793**	**487.565**	**487.565**	**487.565**	**487.565**


Nov
Dec
0
0
487.565
487.565


Monthly
Evaporative loss from ED3
Monthly Evaporation (no evaporators)
Monthly Evaporation (1 evaporator)
Monthly Evaporation (2 evaporators)
Monthly Evaporation (3 evaporators)
Monthly Evaporation- 4 evaporators
Evaporation in ML
0
5
10
15
20
25
30
35
40
45
50
Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Month


Water balance ED3
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
ML in ED3
Water Balance Evaporation from Pond
Water Balance (1 evaporator)
Water Balance (2 evaporators)
Water Balance (3 evaporators)
Water Balance- 4 evaporators
Oct/05
Apr/06
Oct/06
Apr/07
Oct/07
Month

	November	December	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December
	30	31	31	28	31	30	31	30	31	31	30	31	30	31	31	28	31	30	31	30	31	31	30	31	30	31
	58.7	46.1	59.8	51.2	55.6	49.3	47.5	37.9	52.4	47.6	65.2	61.9	58.7	46.1	59.8	51.2	55.6	49.3	47.5	37.9	52.4	47.6	65.2	61.9	58.7	46.1
	1.9	1.5	1.9	1.8	1.8	1.6	1.5	1.3	1.7	1.5	2.2	2.0	1.9	1.5	1.9	1.8	1.8	1.6	1.5	1.3	1.7	1.5	2.2	2.0	1.9	1.5
Average Monthly Pan Evaporation (mm- total)	0.1725	0.22165	0.2232	0.1778	0.1488	0.093	0.0589	0.0405	0.04495	0.06975	0.099	0.13795	0.1725	0.22165	0.2232	0.1778	0.1488	0.093	0.0589	0.0405	0.04495	0.06975	0.099	0.13795	0.1725	0.22165
Estimated monthly evaporation (M3) attributed to 1 evaporator (350 l/min)	6019	6875	6895	5686	5862	4701	4046	3371	3632	4330	4820	5687	6019	6875	6895	5686	5862	4701	4046	3371	3632	4330	4820	5687	6019	6875
Estimated monthly evaporation (M3) attributed to 2 evaporators (350 l/min)	12037	13751	13789	11372	11725	9402	8093	6742	7264	8659	9640	11375	12037	13751	13789	11372	11725	9402	8093	6742	7264	8659	9640	11375	12037	13751
Estimated monthly evaporation (M3) attributed to 3 evaporators (350 l/min)	18056	20626	20684	17058	17587	14103	12139	10113	10895	12989	14460	17062	18056	20626	20684	17058	17587	14103	12139	10113	10895	12989	14460	17062	18056	20626
Estimated monthly evaporation (M3) attributed to 4 evaporator(s) (350 l/min)	24075	27502	27578	22744	23449	18804	16186	13484	14527	17318	19280	22750	24075	27502	27578	22744	23449	18804	16186	13484	14527	17318	19280	22750	24075	27502
Estimated Evaporation (M3) attributed to surface evaporation (no evaporator)	15006.3	19291.2	18596.0	14286.3	11827.1	7397.5	4816.0	3457.6	4001.9	6488.1	9529.3	13544.4	16982.3	21601.0	20657.1	15814.9	13016.6	8081.2	5197.2	3706.7	4272.1	6895.5	10083.4	14273.9	17829.0	22594.3
Estimated Evaporation (M3) attributed to surface evaporation (1 evaporator)	15006.3	18586.8	16798.5	12188.2	9715.6	5845.2	3705.0	2647.1	3070.1	4994.2	7313.1	10292.7	12643.1	15705.6	14263.7	10500.7	8482.3	5096.7	3274.3	2374.8	2773.1	4542.8	6698.9	9492.6	11738.3	14684.1
Estimated Evaporation (M3) attributed to surface evaporation (2 evaporator)	15006.3	17777.3	14847.0	9755.6	6725.4	3443.3	1581.8	988.8	1414.3	2427.2	3296.7	1550.3	643.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	32.2	107.1	123.3	0.0	0.0	0.0
Estimated Evaporation (M3) attributed to surface evaporation (3 evaporator)	15006.3	16861.3	13193.4	7424.1	2837.6	382.6	121.3	65.6	78.0	143.4	178.4	144.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.8	35.5	30.9	0.0	0.0	0.0	0.0
Estimated Evaporation (M3) attributed to surface evaporation (4 evaporator(s))	15006.3	15950.5	10922.7	1049.4	25.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Evaporator evaporation as % of Surface Evaporation (1 evaporator)	40.1%	35.6%	37.1%	39.8%	49.6%	63.5%	84.0%	97.5%	90.8%	66.7%	50.6%	42.0%	35.4%	31.8%	33.4%	36.0%	45.0%	58.2%	77.9%	90.9%	85.0%	62.8%	47.8%	39.8%	33.8%	30.4%
Evaporator evaporation as % of Surface Evaporation (2 evaporators)	80.2%	71.3%	74.2%	79.6%	99.1%	127.1%	168.0%	195.0%	181.5%	133.5%	101.2%	84.0%	70.9%	63.7%	66.8%	71.9%	90.1%	116.3%	155.7%	181.9%	170.0%	125.6%	95.6%	79.7%	67.5%	60.9%
Evaporator evaporation as % of Surface Evaporation (3 evaporator(s))	120.3%	106.9%	111.2%	119.4%	148.7%	190.6%	252.1%	292.5%	272.3%	200.2%	151.7%	126.0%	106.3%	95.5%	100.1%	107.9%	135.1%	174.5%	233.6%	272.8%	255.0%	188.4%	143.4%	119.5%	101.3%	91.3%
Evaporator evaporation as % of Surface Evaporation (4 evaporator(s))	160.4%	142.6%	148.3%	159.2%	198.3%	254.2%	336.1%	390.0%	363.0%	266.9%	202.3%	168.0%	141.8%	127.3%	133.5%	143.8%	180.1%	232.7%	311.4%	363.8%	340.0%	251.2%	191.2%	159.4%	135.0%	121.7%
Evaporation from Pond	15006.33158	19291.2246	18595.96903	14286.305	11827.0785	7397.5361	4815.98473	3457.57676	4001.9273	6488.09051	9529.31306	13544.40844	16982.28	21600.97867	20657.05538	15814.9363	13016.6113	8081.18995	5197.22556	3706.71156	4272.10208	6895.50571	10083.4006	14273.9441	17829.0205	22594.3205
Incident Rainfall	10081.5	7243.5	8819.25	8027.25	6913.5	5626.5	6435	5395.5	6575.25	7656	8217	9050.25	10081.5	7243.5	8819.25	8027.25	6913.5	5626.5	6435	5395.5	6575.25	7656	8217	9050.25	10081.5	7243.5
Water Pumped In	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
Initial Volume stored in ED3																										
Progressive Water Balance (no evaporators)	90976	91051	84003	79226	77967	78054	81283	87902	94840	102413	108581	112268	112774	110874	101516	94678	91891	90787	93333	99571	106259	113562	119323	122457	122233	119485	109135
Progressive RL of dam	789.09	789.02	788.96	788.95	788.95	788.99	789.06	789.13	789.21	789.27	789.31	789.31	789.29	789.20	789.13	789.10	789.09	789.11	789.18	789.25	789.32	789.38	789.41	789.41	789.38	789.27
Progressive Water Balance (1 evaporator)	90976	85032	71813	61939	57093	53428	53509	57192	61569	66443	69775	70859	68929	65349	55011	47672	44513	42082	42911	47025	51674	56845	60628	62327	61197	58521	49205
Progressive RL of dam	789.09	789.03	788.87	788.73	788.67	788.62	788.62	788.67	788.73	788.79	788.84	788.85	788.83	788.78	788.64	788.55	788.50	788.46	788.48	788.54	788.60	788.67	788.72	788.74	788.73	788.69	788.57
Progressive Water Balance (2 evaporators)	90976	79013	58919	42151	31618	22091	17471	17108	18114	19355	18358	14622	7005	0	0	0	0	0	0	68	1346	2885	2339	0	0	0	0
Progressive RL of dam	789.09	788.96	788.70	788.46	788.26	788.07	787.81	787.75	787.93	788.02	787.98	787.28	785.83	784.50	784.50	784.50	784.50	784.50	784.50	784.51	784.76	785.05	784.94	784.50	784.50	784.50	784.50
Progressive Water Balance (3 evaporators)	90976	72995	47751	27693	16238	7727	3868	3042	3259	3861	3385	1963	0	0	0	0	0	0	0	0	282	955	587	0	0	0	0
Progressive RL of dam	789.09	788.88	788.55	788.18	787.58	785.97	785.23	785.08	785.12	785.23	785.14	784.87	784.50	784.50	784.50	784.50	784.50	784.50	784.50	784.55	784.68	784.61	784.50	784.50	784.50	784.50	784.50
Progressive Water Balance- 4 evaporators	90976	66976	35767	11085	320	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Progressive RL of dam	789.09	788.80	788.34	786.60	784.56	784.50	784.50	784.50	784.50	784.50	784.50	784.50	784.50	784.50	784.50	784.50	784.50	784.50	784.50	784.50	784.50	784.50	784.50	784.50	784.50	784.50	784.50

	1/11/2005	1/12/2005	1/01/2006	1/02/2006	1/03/2006	1/04/2006	1/05/2006	1/06/2006	1/07/2006	1/08/2006	1/09/2006	1/10/2006	1/11/2006	1/12/2006	1/01/2007	1/02/2007	1/03/2007	1/04/2007	1/05/2007	1/06/2007	1/07/2007	1/08/2007	1/09/2007	1/10/2007	1/11/2007	1/12/2007
Monthly Evaporation (no evaporators)	15.006	19.291	18.596	14.286	11.827	7.398	4.816	3.458	4.002	6.488	9.529	13.544	16.982	21.601	20.657	15.815	13.017	8.081	5.197	3.707	4.272	6.896	10.083	14.274	17.829	22.594
Monthly Evaporation (1 evaporator)	21.025	25.462	23.693	17.874	15.578	10.546	7.752	6.018	6.702	9.324	12.133	15.980	18.662	22.581	21.158	16.187	14.345	9.798	7.321	5.746	6.405	8.872	11.519	15.180	17.757	21.560
Monthly Evaporation (2 evaporators)	27.044	31.528	28.636	21.127	18.450	12.845	9.675	7.731	8.678	11.086	12.937	12.925	12.681	13.751	13.789	11.372	11.725	9.402	8.093	6.744	7.296	8.766	9.763	11.375	12.037	13.751
Monthly Evaporation (3 evaporators)	33.063	37.487	33.877	24.482	20.425	14.485	12.261	10.179	10.973	13.132	14.638	17.207	18.056	20.626	20.684	17.058	17.587	14.103	12.139	10.113	10.902	13.024	14.491	17.062	18.056	20.626
Monthly Evaporation- 4 evaporators	39.081	43.452	38.501	23.793	23.475	18.804	16.186	13.484	14.527	17.318	19.280	22.750	24.075	27.502	27.578	22.744	23.449	18.804	16.186	13.484	14.527	17.318	19.280	22.750	24.075	27.502

Net pan evaporation (inches/month)	Percentage of volume pumped by evaporator	Net pan evaporation (inches/month)	Percentage of volume pumped by evaporator
1.5	20	7.0	40
2.0	28	7.5	41
2.5	29	8.0	42
3.0	30	8.5	43
3.5	32	9.0	44
4.0	34	9.5	45
4.5	35	10	46
5.0	36	10.5	47
5.5	37	11	48
6.0	38	11.5	49
6.5	39	12	50
7.0	40	12+	up to 85

Net pan evaporation	Percentage of volume pumped by evaporator (from manufacturer specifications)			
1.5	20%	38.1	21.8%	21.8%
2	28%	50.8	24.4%	24.4%
2.5	29%	63.5	26.7%	26.7%
3	30%	76.2	28.7%	28.7%
3.5	32%	88.9	30.5%	30.5%
4	34%	101.6	32.2%	32.2%
4.5	35%	114.3	33.8%	33.8%
5	36%	127	35.2%	35.2%
5.5	37%	139.7	36.6%	36.6%
6	38%	152.4	37.9%	37.9%
6.5	39%	165.1	39.1%	39.1%
7	40%	177.8	40.3%	40.3%
7.5	41%	190.5	41.4%	41.4%
8	42%	203.2	42.5%	42.5%
8.5	43%	215.9	43.5%	43.5%
9	44%	228.6	44.6%	44.6%
9.5	45%	241.3	45.5%	45.5%
10	46%	254	46.5%	46.5%
10.5	47%	266.7	47.4%	47.4%
11	48%	279.4	48.3%	48.3%
11.5	49%	292.1	49.1%	49.1%
12	50%	304.8	50.0%	50.0%
12+	up to 86			

APPENDIX D:

LIQUID ODOUR MEASUREMENT METHODOLOGY

LOM Methodology

The LOM methodology is comprised of the following components:

- Evaporation of a known amount of liquid in a known volume of dry N_2 contained in a Nalophan odour sample bag;
- Determination of the odour concentration of the gaseous sample by Dynamic Dilution Olfactometry following AS/NZS 4323.3; and
- Calculation of the odour concentration in the liquid from the gaseous odour concentration (ou/m^3) and the volume of liquid evaporated to produce the gaseous sample.

Procedure

Liquid Sample Storage

The liquid samples analysed from the Woodlawn Facility were collected from stored leachate in lagoons including ED3N-1, ED3N-2, ED3N-3, ED3N-4, ED3S2, LTD, LAP, and ED1 Coffer Dam. These were refrigerated prior to testing. A liquid sample was extracted immediately from the refrigerated sample bottle and not allowed to warm to room temperature. This is the general procedure when carrying out the liquid odour measurement method for aqueous samples.

Liquid Sample Size

The volume of liquid is determined by the requirement to produce a gaseous sample with a RH of less than 100%. This equates to less than 2.3% v/v water at 20º C, or for a 25 L sample, 413 microlitres (**µL**) of aqueous sample. The method development work carried out to date has shown that 413 µL of liquid sample in 20 L dry nitrogen will evaporate in approximately 30 mins. The nominal liquid sample size required for the Liquid Odour method can be specified as 340-413 µL, which provides a gaseous sample with 80-100% RH. For the liquids samples collected at the Woodlawn Facility, 413 µL of liquid sample was used in 25 L dry nitrogen.

Table D1 details a range of liquid volumes and approximate evaporation times observed from the method development work carried out to date.

Table D1 - Liquid sample volumes, evaporation and equilibration time

Volume µL (% saturation)	Approximate evaporation time (in 25 L dry nitrogen)	Recommended equilibration time (in 25 L dry nitrogen)
280 µL (60%)	~30 min	60 min
340 µL (80%)	~40 min	60 min
413 µL (100%)	~60 min	60 min

Sample Equilibration and Ageing

The development work to date has shown that condensate derived odour samples are not stable and degrade significantly over time. However, the degradation appears insignificant in the first 2-4 hours after preparation of the gaseous samples. Therefore,

samples must be tested within that time period after preparation. For samples prepared at 100% saturation or below, the equilibration time can be standardised to 1 hour.

Sample Preparation and Odour Testing Procedure

The gaseous sample for odour testing is prepared as follows:

1. Dispense 25 L of dry nitrogen into a conditioned Nalophan bag.

2. Place a piece of clear packaging tape (approximately 100 mm long) onto the wall of the bag halfway between the ends. Ensure that at least a 1 cm^2 section of tape completely adheres to the bag with no air bubbles trapped between the tape and bag that could allow a leak of gas to the edge of the tape.

3. Remove the liquid sample from cold storage.

4. Rinse the microlitre syringe (5 x) with the liquid sample.

5. Draw up the required volume of liquid sample (refer to *Liquid Sample Size* and **Table D1**) and record the exact volume in the syringe.

6. Inject the liquid through the tape and wall of the bag at the point where the tape has completely adhered to the bag. Tap the syringe to displace residual drop that adheres to the needle and withdraw the syringe from the bag.

7. Place the second piece of packaging tape over the first piece such that the puncture hole is sealed. Ensure no air bubbles are trapped between the layers of tape such that a leak could occur.

8. Vigorously shake the bag to disperse the liquid droplets inside the bag (to aid in the evaporation rate).

9. Store the bag in the laboratory for the prescribed equilibration time (refer to *Sample Equilibration and Ageing* and **Table D1**) to allow all the liquid to evaporate.

10. At the completion of the equilibration time, carry out the measurement of odour concentration using AS/NZS 4323.3.

Calculation of Liquid Odour Concentration

The odour concentration from a liquid (ou per mL) is calculated from the gaseous sample odour concentration, the volume of liquid used to prepare the gaseous sample and the volume of dry nitrogen:

$$[odour]_{liquid} = \frac{\left(\frac{OU}{m^3} \times \frac{litres_{Nitrogen}}{1000}\right)}{mL_{liquid}}$$

An example of the calculation is presented in **Table D2**.

Table D2 – Example calculation of liquid odour concentration for ED3N-4		
Parameter	**Value**	**Unit**
Volume of liquid from ED3N-4	0.413	mL
Volume of dry N_2	0.025	m^3
Measured odour concentration	59^	ou
Calculated liquid odour concentration	= (59 x 0.025)/(0.413) = 3.57	ou.m^3/mL

^ TOU Sample Number SC22225 – refer to **Table 6.6** in the main report of the Audit

Calculation of Odour Emission Rates from Evaporation of Liquids

A primary driver for the development of a liquid odour measurement is the requirement to predict odour emission rates from liquids area sources (such as storage ponds) as well as condensates. In particular, evaporation of condensates or other odorous refinery waters in cooling towers has been implicated as a significant contributor to refinery odour. With a measurement of the odour from liquids now available, the estimation of emission rates can be considered.

An example is presented below for treated leachate stored in ED3N-4 (SC21163) which returned a measured odour concentration of 8.04 ou.m^3/mL (refer to **Table D2**) with an evaporation rate of 1.396 L/s (based on on-site evaporation data collected by Veolia between May 2007 and June 2012 and current pond surface area):

Odour concentration = 3.57 ou.m^3/mL

Ambient pond evaporation rate = 1.396 L/s

Odour emission rate = 3.57 ou.m^3/mL x 1,291 mL/s
= 4,980 ou.m^3/sec (refer **Table 6.6** in the main report of the Audit)