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Cleanaway Lucas Heights Landfill Annual Environmental Management Report (AEMR) 2023

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Definitions

AEMR	Annual Environmental Management Report
AEP	Annual Exceedance Probability
AQOMP	Air Quality and Odour Management Plan
CRG	Community Reference Group
DP&E	Department of Planning and Environment (Development consent SSD 6835)
DPI	Department of Primary Industries & Water
EDL	Energy Developments Limited
EIS	Environmental Impact Statement
EP&A Act	Environmental Planning and Assessment Act 1979
EPA	NSW Environment Protection Authority
EPL	Environment Protection Licence
EPR	Environmental Performance Review
ERP	Emergency Response Plan
GMP	Groundwater Management Plan
HDPE	High-density polyethylene
LHRRP	Lucas Heights Resource Recovery Park
LP	Leachate pit
MP	Monitoring Point
OEMP	Operational Environmental Management Plan
PCYC	Police Citizens Youth Club
PIRMP	Pollution Incident Response Management Plan
SSC	Southerland Shire Council
SEAR's	Secretary's Environmental Assessment Requirements
TMP	Traffic Management Plan
VPA	Voluntary Planning Agreement

1. Introduction

This Annual Environmental Management Report (AEMR) has been prepared to detail the environmental performance of the Lucas Heights Resource Recovery Park (LHRRP) located at Little Forest Road, Lucas Heights (including the expanded operations). This report has been prepared as per the requirements detailed in Development Consent SSD6835 (the Consent), which commenced on 23/1/2017. Specifically, this report covers 1/1/2023 to 31/12/2023 (the 2023 reporting period).

Section D9 (a) of the Development Consent requires an AEMR to be submitted to the Secretary by the end of February. This AEMR is the seventh report following the commencement of the expanded operations at LHRRP, which was previously owned and operated by SUEZ Resource and Recovery up until 17th December 2021, and thereafter by Cleanaway Waste Management Limited.

In accordance with section D9 of the Consent, the AEMR provides a review of the site environmental performance and a summary of environmental monitoring conducted at LHRRP, recommendations for environmental and operational improvements as a result of regulatory inspections and external feedback, as well as Cleanaway internal quality assurance programs and corrective actions.

Following correspondence from the Department of Planning (now known as DPE), dated 27/3/2019, additional information has been added into the AEMR, specifically in relation to:

- Non-compliance/s;
- Independent Environmental Audit (IEA) non–compliance/s and the Action Plan/s related to these non-compliances;
- Incidents;
- Waste Limits; and
- To address the requirements of the Department of Planning and Environment (DPE) Post Approval (dated 28/6/2019).

This report has been updated to reflect the changes made to the Development Consent SSD6835-Mod-2, confirmed on 23/11/2023.

2. Non-Compliance Register

Based on the information contained within the 2023 AEMR for the Lucas Heights Landfill, the following non-compliances have been identified:

No.	Condition	Description	Status	Details	Actions taken to ensure compliance
No non-compliances for the reporting period of 2023.					

3. Site Background

Cleanaway Lucas Heights Resource Recovery Park is located off Little Forest Rd, Lucas Heights and is approximately 30km South West of the Sydney CBD. The site operates a drop-off for pre-sorted loads of paper and cardboard, steel and aluminium cans, e-waste, scrap metals, limited quantities of sump oil, white goods and vehicle batteries as well as a landfill disposal site accepting up to 970,000 tonnes of general solid waste and asbestos waste per annum based on Development Consent SSD-6835-Mod-2. The site also houses the Lucas Heights Organic Resource Recovery Facility, which collects and processes organic material for recycling into compost.

The site has been operated by Cleanaway Waste Management since December 2021. Previously the facility was managed and operated by SUEZ.

An overview of the location of LHRRP can be seen in Figure 1.

Figure 1: LHRRP Location Map

Further to the above information, the following is a summary of the key activities undertaken during 2023, in addition to the normal waste management operations undertaken at the site:

- Waste filling commenced in Area C.

- Installation of leachate and gas cutoff trench in Area C.

- Installation of a leachate riser at area F

- Completion of wheel wash upgrading works

- Commencement of Stage 1 excavation of the new Garden Organics Area

- Drilling of gas collection wells at Area G

- Gas well installation in Area G.

- Area G capping works in progress

4. Compliance Status Summary

COMPLIANCE REQUIREMENT	DEVELOPMENT PHASE	STATUS	MONITORING METHODOLOGY	EVIDENCE AND COMMENTS
SCHEDULE B ADMINISTRATIVE CONDITIONS				
OBLIGATION TO MINIMISE HARM TO THE ENVIRONMENT				
B1. In addition to meeting the specific performance criteria established under this consent, the Applicant must implement all reasonable and feasible measures to prevent and/or minimise any harm to the environment that may result from the Development	Operational	Compliant	Environmental management plans and procedures have been established to identify, plan and manage environmental aspects and impacts related to the LHRRP.	Independent Audit, BSI Certification, Environmental Risk Register, Environmental Monitoring Data
TERMS OF CONSENT	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
B2. The Applicant must carry out the Development in accordance with the:				
(a) EIS and RTS;	Operational	Compliant	The new GO facility is yet to be constructed. Excavation of the new GO area had commenced in 2023. Overtopping of the landfill at Area C was untaken in 2023. The phasing plan from the EIS was provided to Select Civil, to develop the more detailed fill platform drawings (in consultation with Cleanaway).	Not Applicable
(b) Modification Assessments	Operational	Compliant	Consent MOD-2 approved on 23 November 2023	
(c) Development plans and drawings in the EIS, RTS and Modification Assessments (see Appendix A)	Operational	Compliant	b) The phasing plan from the EIS was provided to Select Civil, to develop the more detailed fill platform drawings (in consultation with Cleanaway). Whilst the sequencing has changed from that proposed in the EIS for operational reasons relating to managing gas, leachate and surface water, the overall footprint remains the same.	Reflected in the survey plan submitted to EPA
(d) the Management and Mitigation Measures (see Appendix B); and	Operational	Compliant	The Management and Mitigation Measures (landfill) included in Appendix B of the Consent have been included in the Landfill Operational Environmental Management Plan (OEMP). GO excavation began in January 2023.	Regular planning meetings with Select Civil for re-profiling work
(e) the draft landfill, GO and Post Closure Environmental Management Plans included in the EIS	Development phase	Not Triggered	Landfill OEMP submitted. GO excavation began in January 2023.	Not Applicable
(f) the draft landfill, GO and Post Closure Environmental Management Plans included in the EIS		Not triggered	N/A	N/A
B3. If there is any inconsistency between the plans and documentation referred to in Condition B2 above, the most recent document must prevail to the extent of the inconsistency. However, the conditions of this consent shall prevail to the extent of any inconsistency.	Pre-Construction	Not triggered	N/A	N/A

B4. The Applicant must comply with any reasonable requirement(s) of the Planning Secretary arising from the Department's assessment of: (a) any reports, plans or correspondence that are submitted in accordance with this consent; and (b) the implementation of any actions or measures contained in these documents.	Noted	N/A	N/A	N/A
LIMITS OF CONSENT	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
B5. This consent lapses five years after the date from which it operates unless the Development has physically commenced on the land to which the consent applies before the date on which the consent would otherwise lapse under Section 95 of the EP&A Act.	Operational	Compliant	SUEZ commenced re-profiling in January 2018, Cleanaway continued with reprofiling. Excavation for the GO facility commenced in January 2023.	Re-profiling has commenced.
B6. The Applicant shall not receive more than:				
(a)970,000 tonnes of general solid waste (putrescible and non-putrescible) and asbestos waste per calendar year on site for landfill disposal;	Operational	Compliant	956,740 tonnes received for 2023 calendar year. The tonnage limit was increased to 970,000 tonnes under SSD-6835-Mod-2.	Mandalay, Monthly Tonnage report.
(b) 10,000 tonnes of recyclable general solid waste (non-putrescible) and batteries per calendar year on site at the Resource Recovery Centre and waste collection point;	Operational	Compliant	Less than 10,000t of recyclables received in 2023	Mandalay, Monthly Tonnage report.
(c) 100,000 tonnes of garden and wood waste and 2,000 tonnes of manure per calendar year at the GO Facility;	Operational	Compliant	42,935 tonnes received in 2023 calendar year.	Mandalay, Monthly Tonnage report.
(d) the quantity of waste required to meet the final landform profile described in the EIS.	Not Triggered	Not Triggered	N/A	N/A
B7. The receipt, processing, and disposal of waste at the landfill and GO Facility must cease at the end of 2037.	Not Triggered	Not Triggered	N/A	N/A
OTHER CONSENTS AND APPROVALS	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
B8. Within 6 months of the date of this consent, the Applicant must modify DA 11- 01-99 to remove the conditions of that consent that relate to the LHRRP. The modification must be in accordance with the Environmental Planning and Assessment Regulation, 2000. The modification is required to ensure all activities undertaken at the LHRRP are covered by this consent only.	Operational	Compliant	Modification was approved by Industry Assessment on 26/8/2019.	Department of Planning, Industry and Environment 2019 approval.
STATUTORY REQUIREMENTS	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**

B9. The Applicant must ensure that all licences, permits and approval/consents are obtained as required by law and maintained as required throughout the life of the Development. No condition of this consent removes the obligation for the Applicant to obtain, renew or comply with such licences, permits or approval/consents.	Operational	Compliant	Development Consent SSD 6835 · EPL 5065 – covers operations of the landfill. · EPL 12520 – covers operation of the existing Organics facility. · EPL 13114 – was surrendered, EPA approval issued 30 July 2019. · Trade Waste Agreement with Sydney Water · Voluntary Planning Agreement (VPA) with Sutherland Shire Council, The ANSTO Agreement under which Cleanaway lease land owned by ANSTO. Development Consent SSD-6835-Mod-2 was issued on 23/11/2023.	Applicable Licences, permits and approvals/consents are held in on-site operations office.
STRUCTURAL ADEQUACY	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
B10. The Applicant must ensure that all new buildings and structures, and any alterations or additions to existing buildings and structures are constructed in accordance with the relevant requirements of the BCA.	Not Triggered	Not Triggered	N/A	N/A
Notes: • Under Part 4A of the EP&A Act, the Applicant Is required to obtain construction and occupation certificates for the proposed building works; and • Part 8 of the EP&A Regulation sets out the requirements for the certification of the Development.	Noted	N/A	N/A	N/A
OPERATION OF PLANT AND EQUIPMENT	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
B11 The Applicant must ensure that all plant and equipment used for the Development are:				
(a) maintained in a proper and efficient condition; and	Operational	Compliant	**Landfill** Select Civil is responsible for maintaining plant and equipment used on the landfill. Select Civil use a number of tools including: • Pre-start checklists. • The Plant Assessor. • On-site maintenance workshop for non-major repairs. • Calibration/Inspection and Testing of Equipment Register. **Organics Facility** Cleanaway was responsible for maintaining the Organics Facility plant and equipment, Cleanaway used a number of tools including: • Pre-start checklists. • The Cleanaway system which tracks required regular maintenance and issues noted in pre-start checklists. **Water treatment plant and leachate treatment plant.** Both plants are maintained by JPG Engineering. JPG use a number of tools including: • A Maintenance Leachate Inventory and Operations Checklist completed on a daily basis. • Monitoring through SCADA which sends low flow, high level alarm alerts to JPG Engineering. JPG view the SCADA system online and receive emergency updates for example high-level alarms. • JPG provide Cleanaway with the records of maintenance.	Records held in on-site operations office.
(b) Operated in a proper and efficient manner.	Operational	Compliant	Refer to the above information.	N/A
PROTECTION OF PUBLIC INFRASTRUCTURE	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**

B12. Prior to the commencement of construction, the Applicant must:				
(a) prepare a dilapidation report of the public infrastructure in the vicinity of the site (including roads, kerbs, footpaths, nature trip, street trees and furniture); and	Development phase	Compliant	A dilapidation report was prepared by AECOM dated 20 April 2017.	Records held in on-site operations office.
(b) submit a copy of this report to the Planning Secretary and Council.	Development phase	Compliant	Dilapidation report submitted to DoP on 7 July 2017.	N/A
B13. The Applicant must:				
(a) repair, or pay the full costs associated with repairing, any public infrastructure that is damaged as a result of the Development; and	Not Triggered	Not Triggered	N/A	N/A
(b) relocate, or pay the full costs associated with relocating, any public infrastructure that needs to be relocated as a result of the Development.	Not Triggered	Not Triggered	N/A	N/A
STAGED SUBMISSION OF PLANS OR PROGRAMS	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
B14. With the approval of the Planning Secretary, the Applicant may: (a) submit any strategy, plan, or program for the landfill re-profiling and GO Facility construction and operation, required by this consent, on a progressive basis; and/or (b) combine any strategy, plan or program required by this consent.	Development phase	Compliant	Staged submission approved by Planning and Environment 22 February 2018.	Records held in operations office.
DISPUTE RESOLUTION	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
B15. In the event that a dispute arises between the Applicant and either Council or a public authority, in relation to an applicable requirement in this consent or relevant matter relating to the Development, either party may refer the matter to the Planning Secretary for resolution. The Planning Secretary's determination of any such dispute must be final and binding on the parties. Note: This condition does not relate to disputes raised regarding matters in the Voluntary Planning Agreement required under Condition 819.	Not Triggered	Not Triggered	N/A	N/A
COMPLIANCE	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
B16. The Applicant must ensure that employees, contractors, and sub-contractors are aware of, and comply with, the conditions of this consent relevant to their respective activities.	Operational	Compliant	Employees and contractors would be made aware of the section/s of the Consent relevant to their work through Toolbox Talks and Standard Operational Procedures.	Record of these is held in the on-site administration office.
B17. The Applicant must be responsible for environmental impacts resulting from the actions of all persons that it invites onto the site, including contractors, sub-contractors and visitors.	Noted	N/A	N/A	N/A
EVIDENCE OF CONSULTATION	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
B18. Where consultation with any public authority or community group is required by the conditions of this consent, the Applicant must: :				
(a) consult with the relevant public authority or community group prior to submitting the required documentation to the Planning Secretary for approval,	Operational	Compliant	ANSTO and Sutherland Shire Council are consulted prior to any submission.	CRG meeting records

where required;				
(b) submit evidence of this consultation as part of the relevant documentation required by the conditions of this consent; and	Operational	Compliant	Consent Modification SSD 6835 MOD 1 approved on 5 June 2018. MOD 2 submitted on 21 December 2022. MOD 2 approved on 23 November 2023.	N/A
(c) include the details of any outstanding issues raised by the relevant public authority or community group and an explanation of or agreement between any public authority or community group and the Applicant or any person acting on this Development consent.	Operational	Compliant	No outstanding actions.	N/A
PLANNING AGREEMENT	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
B19. Prior to the commencement of construction and prior to receiving increased tonnes of waste in accordance with Condition B6(a), the Applicant must enter into the Voluntary Planning Agreement with Council in accordance with the Letter of Offer dated 15 December 2016.	Development Phase	Compliant	Quarterly meeting held with council.	VPA Meeting records
SCHEDULE C SPECIFIC ENVIRONMENTAL CONDITIONS	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
WASTE Receipt, Storage & Handling of Waste.				
C1. The Applicant must only receive waste on site that is authorised for receipt by an EPL.	Operational	Compliant	Unacceptable waste would be rejected and sent to an alternative appropriately licensed facility.	Rejected waste is recorded in Mandalay reports.
C2. The Applicant must ensure any waste generated on the site during construction is classified in accordance with the EPA's Waste Classification Guidelines, 2014 or its latest version, and disposed of to a facility that may lawfully accept the waste.	Not Triggered	Not Triggered	N/A	N/A

C3. The Applicant must: implement auditable procedures to: i. ensure the site does not accept wastes that are prohibited; ii. screen incoming waste loads; and (b) ensure that: i. all waste types that are controlled under a tracking system have the appropriate documentation prior to acceptance at the site; and ii. staff receive adequate training in order to be able to recognize and handle any hazardous or other prohibited waste.	Operational	Compliant	Weighbridge staff and staff at the public drop off are trained in SOP40 and other relevant SOPs including SOP030.3 – Radioactive Waste and Work Instruction 063.6 – Asbestos Waste Management. Incoming loads are visually screened by the weighbridge operator where possible and any waste that is not licensed to be received at the site is rejected. Waste brought to site by the public are sent to the public waste drop-off where Cleanaway staff monitor waste disposed of at the respective drop-off point e.g., general waste, green waste, mattresses, and e-waste. Asbestos must be bagged appropriately to be disposed of on-site, otherwise the load is rejected. A Rejected Load Form is completed for all rejected loads and they are recorded in a rejected load register. The rejected load register maintained at the weighbridge was sighted during the audit. The register included the date, docket number, registration of the vehicle, product (waste type), the reason for not tipping and was signed by the weighbridge attendant. Lucas Heights Landfill does not accept any trackable waste.	Training records
Monitoring	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
C4. The Applicant must provide details of the quantity, type and source of wastes received on the site and provide these details to the EPA and the Planning Secretary when requested.	Operational	Compliant	Section 88 Return provided to the EPA monthly. Mandalay reporting system manages waste in and out of site.	WARRP and weighbridge Records
Landfill Operations	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
C5. To minimise the potential for odour generation, the Applicant must, unless otherwise agreed in writing by the EPA:				
(a) ensure a maximum of 1 hectare of existing intermediate cover or 2 hectares of existing final capped cover may be stripped in advance of landfilling to form the prepared surface. The prepared surface must have a minimum depth of 300 millimetres;	Operational	Compliant	Select Civil Daily site sheets.	Records held in on-site operations office.
(b) at any one time a maximum of 2,500 metres squared of the prepared surface may be stripped back to expose previously landfilled waste to form the active tip face; and	Operational	Compliant	Select Civil Daily site sheets.	Records held in on-site operations office.
(c) the landfill gas field infrastructure must be retained and operating at all times, with the exception of the stripped back prepared surface.	Operational	Compliant	Monthly reports from Energy Development Limited.	Records held in on-site operations office.
Imported Soil	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
C6. The Applicant must:				

(a) ensure that only VENM or ENM or other material approved in writing by the EPA is used as fill on the site;	Operational	Compliant	Mandalay	Operational OPDs Approved by EPA prior to delivery.
(b) keep accurate records of the volume and type of fill to be used; and	Operational	Compliant	Mandalay	Operational OPDs Approved by EPA prior to delivery.
(c) make these records available to the Planning Secretary upon request.	Operational	Compliant	Mandalay	Operational OPDs Approved by EPA prior to delivery.
C7. During construction, the Applicant must ensure any material brought on site for use as fill meets the requirements of the relevant Resource Recovery Order and Exemption issued under the Protection of the Environment Operations (Waste) Regulation 2014, to apply that material to land. The Applicant must retain records of all material brought on site for filling purposes and provide the records to the EPA and the Planning Secretary when requested.	Operational	Compliant	Mandalay	Operational OPDs Approved by EPA prior to delivery.
ODOUR & AIR QUALITY Limits	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
C8. The Applicant must ensure the Development does not cause or permit the emission of any offensive odour, as defined in the POEO Act.	Operational	Compliant	Odour Patrols. The tip face size is limited. Waste is covered at the end of each day. An odour unit and odour fences are in place around the landfill and odour control measures are in place around the GO receivals area. The leachate and organics dams are aerated. Weather conditions were monitored for when possible odorous works are undertaken. Ongoing installation of additional landfill gas collection wells. EDL, the operators of the gas infrastructure, undertake inspections and identify areas that require additional wells or additional clay cover.	Odour patrol recorded and Select Civil Daily inspection record this information.
C9. The Applicant must:				
(a) operate and maintain all facilities within the site in a condition which controls the emission of dust; and	Operational	Compliant	Daily site checks and environmental monitoring undertaken.	Dust gauge monitoring
(b) carry out all reasonable and feasible measures to minimise dust from the site.	Operational	Compliant	Two water carts used, Monthly Dust Monitoring on site, Continuous Dust monitoring linked to weather station.	Dust monitoring records, Select Civil Daily checks
Meteorological Monitoring	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
C10. The Applicant must install, operate, and maintain a meteorological weather station on the site that complies with the requirements of an EPL for the site.	Operational	Compliant	Weather Station maintained on site.	Daily reports sent out by the system and all data available online. Data is downloaded and stored at regular intervals.
Site Air Quality and Odour Management Plan	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
C11. The Applicant must prepare a Site Air Quality and Odour Management Plan. The plan must:				
(a) Be prepared by a suitably qualified and experienced person in consultation with the EPA and Council; (b) Be submitted to the Planning Secretary prior to the commencement of	Development Phase	Compliant	The AQOMP was prepared by SUEZ personnel, now Cleanaway. The AQOMP was submitted to the EPA by email dated	A record of consultation with the EPA, Council and DPE is provided in Section 13 of the AQOMP.

construction; (c) list all emission sources across the LHRRP and key performance indicators for each emission type; (d) describe odour and dust monitoring methods, location, frequency, and duration; (e) show the locations of real-time dust monitors on and off-site with appropriate trigger values; (f) report on the performance of the site against the key performance indicators for each emission type; (g) detail proactive mitigation measures for the control of dust and odour impacts; (h) detail the contingency measures to be implemented to respond to complaints or if dust or odour impacts are identified; and (i) include record keeping, a complaint register and compliance reporting.			27 October 2017. A letter was received from the EPA dated 21 November 2017 stating that the EPA considers the AQMP has considered the matters required by Condition C11 and providing one comment for SUEZ's consideration (to consider the impacts from uncapped areas and/or lack of vegetative matter on surface areas, and the subsequent potential to contribute to sediment loads in surface waters and windblown dust). The SCC provided feedback on the AQOMP, dated October 2017. The SCC made a number of comments. SUEZ response to the SCC was provided to the auditors and is included in the OEMP. SUEZ reported that SCC did not provide further comments. The final AQOMP was submitted to the department on 9.02.18.	
C11A, The Applicant must update the Site Air Quality and Odour Management Plan required by Condition C11 of this consent to include the Modification Assessments. The updated plan must:	Not triggered	Not triggered	N/A	N/A
(a) be prepared by a suitably qualified and experienced person in consultation with the EPA; (b) be submitted to the Planning Secretary within six months of the determination of SSD- 6835-MOD-2; (c) detail additional mitigation measures which will be employed to prevent future odour emissions at the site; and (d) address the requirements of Condition C11 of this consent.				
Landfill	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
C12, The Applicant must conduct an odouraudit of the landfill to validate the odour reductions described in the EIS have been achieved at the existing landfill. The odour audit must: be prepared by a suitably qualified and experienced person in consultation with the EPA and Council; be submitted to the EPA, Council, and the Planning Secretary at least one month prior to the commencement of landfill re-profiling; include collection and analysis of odour samples in accordance with the EPA's Approved Methods for Sampling and Analysis of Air Pollutants in NSW; and identify mitigation measures with a timeline for implementation, where the odour reductions identified in the EIS are not being achieved.	Development Phase	Compliant	The LHRRP Landfill Odour Audit was conducted by GHD (report dated October 2017) and submitted to SCC 25 September 2017. The report was also sent to EPA on 25 September 2017.	Records are kept in the on-site operations office.
GO Facility	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
C13. All organic material and waste must be stored at the GO Facility in accordance with the requirements of an EPL for the site, including limits on the height of stockpiles and use of breathable membrane covers on compost bunkers.	Not triggered	Not triggered	N/A	N/A
C14, The Applicant must conduct an odour audit of the GO Facility to validate the odour data used in SSD-6835-MOD-2. The odour audit must:	Not triggered	Not triggered	N/A	N/A

(a) be prepared by a suitably qualified and experienced person in consultation with the EPA and Council; (b) be submitted to the EPA, Council and the Planning Secretary within 12 months of commencement of operation of the GO Facility, as described in SSD-6835-MOD-2; (c) include collection and analysis of odour samples in accordance with the EPA's Approved Methods for Sampling and Analysis of Air Pollutants in NSW; (d) validate the efficiencies of the odour controls, specifically the tunnel pasteurisation technology used for the active composting stage; (e) validate the odour data for freshly turned material; (f) demonstrate that the final design achieves an equivalent or better performance than stated in the Modification Assessment, supported by dispersion modelling in accordance with EPA's Approved Methods for Sampling and Analysis of Air Pollutants in NSW, if required; and (g) identify additional mitigation measures with a timeline for implementation, where odour performance significantly differs from the predictions in the Modification Assessments.	Not triggered	Not triggered	N/A	N/A
GREENHOUSE GAS	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
C22. The Applicant must implement all reasonable and feasible measures to minimise energy use on site and greenhouse gas emissions produced on site.	Operational	Compliant	Cleanaway reports its energy use and greenhouse gas emissions under the National Greenhouse Gas and Energy Reporting Scheme (NGERs). This is done at the corporate level with input from the facilities. The main method in which Cleanaway minimises greenhouse gas emissions is through the efficient operation of the gas infrastructure. The gas infrastructure installed on site collects landfill gas and converts it into electricity.	Monthly reports from EDL.
LEACHATE Landfill — Dual Gas and Leachate Trench	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
C23. The Applicant must design and install a dual gas and leachate management trench near the perimeter of the re-profiled landfill to intercept sideways movement of leachate. The trench must: be designed in accordance with the requirements of the EPA; be approved by the EPA, prior to construction of the trench and landfill re- profiling; include extraction risers along the length of the trench to allow extraction and transfer of leachate to the existing ring main; and be installed in accordance with a CEMP, prepared by a suitably qualified person and submitted to the EPA at least one month prior to construction of the trench	Development Phase	Compliant	CEMP, Part 1 – Landfill Related Construction works only, Dual Gas and Leachate Trench construction works, dated July 2017, and The Dual Gas and Leachate Trench Concept Design, to the EPA on the 20.07.17. The EPA provided a letter response, dated 10.10.17, which stated that the EPA has approved the installation.	Records held in on-site operations office.
Landfill Gas Infrastructure	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
C24. The Applicant must maintain and operate the landfall gas infrastructure on the site, at all times. The Applicant must retain and operate the gas collection system within the prepared surface (stripped back cover) as much as	Operational	Compliant	EDL maintain gas infrastructure. Quarterly surface gas monitoring as per Landfill EPL (EPL 5056).	Monthly Reports from EDL.

practicable.				
Operating Conditions	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
C25. Accumulated sludge and sediment formed during leachate storage at the site must be disposed of to a special waste area at the LHRRP, separate from the active tip face.	Operational	Compliant	No disposal in 2023	N/A
C26. The Applicant must manage all water that comes into contact with waste at the GO Facility as leachate. Leachate generated at the GO Facility may only be reused in the composting process on site or disposed to sewer in accordance with a Trade Waste Agreement or as otherwise agreed in writing with the EPA.	Not Triggered	Not Triggered	N/A	N/A
Leachate Monitoring	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
C28. The Applicant must routinely monitor leachate volumes from all sources to evaluate the need to re-calibrate the leachate model included in the EIS, and to ensure adequate storage, treatment and disposal capacity is maintained at all times. The leachate model must be recalibrated if ongoing monitoring demonstrates that leachate is being generated more than can be routinely managed at the site, or at least every five years. The Applicant must report the results of ongoing monitoring and status of the modelling in the Annual Review required under Condition D9.	Operational	Compliant	Monitoring of leachate volume is maintained by JPG. Leachate Model was recalibrated by GHD in October 2023	Monthly reports from JPG.
C29. The Applicant must implement any recommended measures identified by leachate model calibrations to maintain adequate storage, treatment, and disposal capacity for the LHRRP at all times.	Operational	Compliant	Recalibration every 5 years.	N/A
SURFACE WATER & GROUNDWATER Discharge Limits	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
C30. The Development must comply with Section 120 of the POEO Act, which prohibits the pollution of waters, except as expressly provided for in an EPL.	Operational	Compliant	Sampling undertaken according to the requirements of EPL5065.	Results submitted to EPA in Annual Return.
GO Facility	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
C31. The Applicant must ensure excess water collected in the leachate dams at the GO Facility during high rainfall periods is transported off-site and disposed of lawfully or discharged to sewer in accordance with a Trade Waste Agreement.	Not Triggered	Not Triggered	N/A	N/A
C32. The Applicant must prepare and submit a detailed design for managing surface water from the western and eastern operational areas at the GO Facility detailed in SSD-6835-MOD-2. The design must: (a) be approved by the EPA prior to commencement of operation of the GO Facility; (b) demonstrate that surface water runoff from roofs (including the covered maturation area) does not come into contact with waste; (c) describe a program for ongoing monitoring of the water quality at the GO facility, including discharge of surface water to Mill Creek.	Not Triggered	Not Triggered	N/A	N/A
Mill Creek	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
C33. The Applicant must prepare an Aquatic Habitat Monitoring Plan to monitor the stream health of Mill Creek within the site. The plan must:	Not Triggered	Not Triggered	The Aquatic Habitat Monitoring Plan was prepared in April 2021, submitted and approved by the Department in June 2021.	N/A

(a) be prepared by a suitably qualified and experienced person in consultation with DPE Water; (b) be submitted to the Planning Secretary prior to construction of the GO Facility; (c) describe the monitoring locations, frequency and parameters to be measured; and (d) detail the measures to be implemented if monitoring indicates the habitat quality of Mill Creek is decreasing as a result of activities on the site C34. The Applicant must prepare a Mill Creek Stream Rehabilitation, Stabilization and Vegetation Management Plan. The plan must: (e) be prepared by a suitably qualified and experienced person in consultation with DPE Water; (f) be submitted to the Planning Secretary prior to construction of the GO Facility; (g) be prepared in accordance with DPE Water Guidelines for Controlled Activities on Waterfront Land; detail proposed stream realignment works including details of the measures to minimise water quality impacts; (h) detail the proposed rehabilitation and stabilization of the stream including methods and staging of works; detail opportunities to maximise the width of riparian zones, particularly in the final landform design, and detail the vegetation types, maintenance, monitoring and performance criteria for the rehabilitation works; and (i) be updated to include any changes to the rehabilitation objectives and staging approved in the Post Closure Plan for the (j) site, required under Condition C40.				
Groundwater Management Plan C35. The Applicant must prepare or update a Groundwater Management Plan for the site. The plan must: (a) be prepared by a suitably qualified and experienced person, in consultation with the EPA and DPE Water; (b) be submitted to the Planning Secretary, prior to the commencement of construction; (c) detail the groundwater monitoring network including location and frequency of monitoring, the parameters for testing, relevant criteria, and trigger levels for action; (d) include a protocol for investigation, notification, and mitigation of any exceedances of the identified trigger levels; and (e) describe the measures that could be implemented to respond to identified groundwater contamination.	Operational	Compliant	SUEZ has prepared a Groundwater Management Plan (GMP), dated 31.01.18. The plan was prepared by Douglas Partners, in consultation with the EPA and DPI. SUEZ met with DPI Water for a consultation meeting on the 28.07.17. Further comments provided by DPIE Water in March 2020. GMP was submitted to DPIE as part of the revised OEMP on 4 November 2021.	Ground Water monitoring results are reported to the EPA in the annual return. Results are also published to the Cleanaway Environmental Management website.
Groundwater Monitoring	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
C36. The Applicant must monitor groundwater from the extensive bore network established at and within proximity to the LHRRP, as in accordance with the requirements of the EPL for the site and groundwater management plan required under Condition C35.	Operational	Compliant	Two additional groundwater monitoring bores installed to the west of the facility. Quarterly licensed monitoring.	Ground Water monitoring results are reported to the EPA in the annual return. Results are also published to the Cleanaway Environmental Management website.
Bunding	**DEVELOPMENT**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**

	PHASE			
C37. The Applicant must store all chemicals, fuels and oils used on the site in appropriately bunded areas in accordance with the requirements of all relevant Australian Standards, and/or the EPA's Storing and Handling of Liquids: Environmental Protection — Participants Handbook.	Operational	Compliant	Two 60,000 L diesel tank used for refueling collection vehicles and Select Civil Plant and equipment are both fully bunded.	Monthly Site inspections.
FINAL LANDFORM, REHABILITATION & CLOSURE	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
Final Landform				
C38. The Applicant must rehabilitate the site to achieve the final landform shown in Appendix C, in accordance with the criteria in the EPA's Environmental Guidelines: Solid Waste Landfills, 2016, or its latest version.	Not triggered	Not Triggered	N/A	N/A
C39. The Applicant must ensure the height of the final landform does not exceed 179.9 metres Australian Height Datum (AHD) post-settlement of the waste mass and final capping, as described in the EIS.	Not triggered	Not Triggered	N/A	N/A
Post-Closure Plan	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
C40. The Applicant must amend the draft Post-Closure Plan for the site, to the satisfaction of the Planning Secretary. The plan must: be prepared by a suitably qualified and experienced person; be submitted to the EPA and the Planning Secretary 12 months prior to the planned closure of the landfill and GO facility on the site; be approved by the EPA, Council, ANSTO and the Planning Secretary, prior to commencement of the final phase of landfill capping and rehabilitation works; detail the requirements for on-going management of the capped waste mass; describe monitoring and management measures to ensure integrity of the cap; describe on-going leachate and surface water management, odour and dust control; detail landfill gas monitoring and maintenance; identify future land uses on the site, developed in consultation with Council, ANSTO, the Cronulla Model Aero Club and local recreational and sporting groups; include a rehabilitation management plan, including, but not limited to: rehabilitation works as generally depicted in Appendix C; criteria for evaluating the effectiveness of the rehabilitation; a program and schedule to monitor the effectiveness of the rehabilitation; a program and schedule for routine maintenance of the rehabilitation; any remedial actions necessary to ensure the success of the rehabilitation; a weed management plan; and incorporate the post closure requirements detailed in the VPA	Not Triggered	Not Triggered	N/A	N/A
VISUAL AMENITY	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
C41. The Applicant must undertake screen planting as shown on the plan in Appendix D to minimise the visual impacts of the Development. The planting must be undertaken within 6 months of the date of this consent, or as otherwise agreed with the Planning Secretary, subject to agreement with ANSTO for works on ANSTO's land. Evidence of implementation of the planting must be provided to the satisfaction of the Planning Secretary, within one month of completing the planting.	Not Triggered	Not Triggered	N/A	N/A

C42. The Applicant must progressively hydro-mulch and grass completed landfill areas to minimise the visual impacts of the Development.	Not Triggered	Not Triggered	N/A	N/A
C42A. The Applicant must ensure any lighting associated with the operation of the landfill: (a) complies with the latest version of AS 4282 (INT) - Control of Obtrusive Effects of Outdoor Lighting; and (b) is mounted, screened and directed in such a manner that it does not create a nuisance to surrounding properties or the public road network.	Operational	Compliant	The lights are meeting the requirements	
BIODIVERSITY **Construction**	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
C43 The Applicant must prepare a Vegetation and Fauna Management Plan to minimise impacts on biodiversity during construction of the GO Facility, to the satisfaction of the Planning Secretary. The plan must: (a) be prepared by a suitably qualified and experienced ecologist; (b) be submitted to the Planning Secretary, prior to the commencement of construction of the GO Facility; (c) include a vegetation clearing protocol and pre-clearance surveys; (d) detail specific procedures for protecting native vegetation, including the Coastal Upland Swamp, and fauna adjacent to construction areas, including the access track near the GO Facility, the sediment pond and the verge adjacent to Heathcote Road; (e) detail erosion and sediment controls and weed management procedures; and (f) include procedures for seed collection and translocation of key species, including (g) Allocasuarina diminuta subsp. Mimica and Acacia bynoeana.	Not Triggered	Not Triggered	The Vegetation and Fauna Management Plan was prepared in April 2021, submitted and approved by the Department in June 2021.	N/A
C44. The Applicant must appoint a qualified and experienced ecologist to be present on site during native vegetation clearing for construction of the GO Facility and realignment of Mill Creek.				
Biodiversity Offset Strategy	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
C45. The Applicant must purchase and retire the ecosystem and species credits listed in Table 1, in accordance with EHG's Frameworks for Biodiversity Assessment 2014 and the NSW Biodiversity Offsets Policy for Major Projects 2014, to the satisfaction of the Planning Secretary. The credits must be purchased and retired prior to construction of the relevant facility listed in Table 1,	Developmental Phase	Compliant	Biodiversity credits were purchased in 2022 for the GO Facility.	Biodiversity credits

Table 1: Biodiversity Offset Strategy

Facility	No. of Credits	Offset Type
GO Facility	185 ecosystem	Red Bloodwood – Scribbly Gum heathy woodland on sandstone plateaux
	97 species	Eastern Pygmy-possum
Former ARRT Facility	143 ecosystem	Red Bloodwood – Scribbly Gum heathy woodland on sandstone plateaux
	88 species	Eastern Pygmy-possum
	5154 species	*Allocasuarina diminuta subsp. mimica*

Note: the areas referred to in Table 1 are shown on the figures in Appendix A.				

C46. The Applicant must not commence construction of a facility listed in Table 1, until the Biodiversity Offset Strategy for that facility has been implemented, to the satisfaction of the Planning Secretary.	Developmental Phase	Compliant	Excavation for the GO Facility commenced in January 2023, biodiversity credits were purchased for the GO Facility in 2022.	Biodiversity credits
C47. The Applicant must ensure the biodiversity offsets are secured by a conservation mechanism, which protects and manages the land in perpetuity, to the satisfaction of the Planning Secretary.	Operational	Compliant	The biodiversity offset strategy was approved by DPIE on 30 November 2022	Biodiversity credits
TRANSPORT AND ACCESS	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
Construction Traffic Management Plan				
C48. The Applicant must prepare a Construction Traffic Management Plan for construction of the GO facility. The plan must: be prepared by a suitably qualified and experienced expert, in consultation with Council and TfNSW; be submitted to the Planning Secretary, prior to the commencement of construction of the GO Facility; detail the measures to be implemented to ensure road safety and network efficiency during construction; detail heavy vehicle routes, access, and parking arrangements; include a Driver Code of Conduct to: • minimise the impacts of construction works on the local and regional road network; • minimise conflicts with other road users; • ensure truck drivers use specified routes; include a program to monitor the effectiveness of these measures; and if necessary, detail procedures for notifying residents and the community, of any potential disruptions to routes.	Not Triggered	Not Triggered	The Construction Traffic Management Plan was prepared in May 2021, submitted and approved by the Department in June 2021.	N/A
Intersection Safety Review	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
C49. The Applicant must conduct a safety review of the Little Forest Road and New Illawarra Road intersection in the years 2020 and 2025 to ensure the on-going safe and efficient performance of the intersection. The safety reviews must be prepared to the satisfaction of the Planning Secretary and must: be prepared by an independent traffic expert; be undertaken in consultation with Council and TfNSW and in accordance with relevant guidelines; (c) be approved by the Planning Secretary and TFNSW, by the end of 2020 and 2025; analyse vehicle movements and delays during peak periods; establish intersection performance and the need for any intersection upgrade works; and include a program for implementation of intersection upgrade works, if required.	Operational	Compliant	Report submitted on 27 Jan 2021 rather than by end of 2020. Approval from DPIE received on 17 Feb 2021.	N/A
C50 The Applicant must implement the recommendations of the safety reviews, including any required intersection upgrades, to the satisfaction of the Planning Secretary and TfNSW. The timing and payment for implementation of any required intersection upgrades must be agreed with the Planning Secretary and TfNSW.	Operational	Compliant	No upgrading works have been proposed.	N/A
Operating Conditions	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
C51. The Applicant must ensure: all staff vehicles, plant and equipment are parked on site and do not park on the public road network; all loading and unloading of materials is carried out on site; all trucks	Operational	Compliant	There is no offsite parking. Street sweeper in regular use, site inspections, traffic control, signage, weighbridge operators monitor vehicles entering and leaving site.	Site inspections.

<table>
<tr><td>entering or leaving the site with loads have their loads covered; vehicles do not track dirt onto the public road network; and heavy vehicles use designated routes to minimise impacts on the local and regional road network.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Parking</td><td>DEVELOPMENT PHASE</td><td>STATUS</td><td>MONITORING METHODOLOGY</td><td>EVIDENCE AND COMMENTS</td></tr>
<tr><td>C52. The Applicant must provide sufficient parking facilities for site personnel and heavy vehicles on the site, to ensure traffic associated with the site does not utilise public and residential streets or public parking facilities.</td><td>Operational</td><td>Compliant</td><td>Weighbridge operator direct vehicles to correct location, public drop off area maned to direct traffic.</td><td>Site inspections.</td></tr>
<tr><td>NOISE Hours of Work</td><td>DEVELOPMENT PHASE</td><td>STATUS</td><td>MONITORING METHODOLOGY</td><td>EVIDENCE AND COMMENTS</td></tr>
<tr><td>C53. The Applicant must comply with the hours detailed in Table 2, unless otherwise agreed in writing by the EPA or the Planning Secretary.</td><td>Operational</td><td>Compliant</td><td>Controlled by weighbridge opening hours.
Temporary approval for landfill to extend it’s hours of operation from 3am-5pm has been granted by DPE and EPA.</td><td>Weighbridge records, temporary approval from DPE and EPA.</td></tr>
<tr><td>Table 2: Hours of Work</td><td>DEVELOPMENT PHASE</td><td>STATUS</td><td>MONITORING METHODOLOGY</td><td>EVIDENCE AND COMMENTS</td></tr>
<tr><td colspan="5">Table 2 Hours of Work
<table>
<tr><th>Facility</th><th>Activity</th><th>Day</th><th>Time</th></tr>
<tr><td>Landfill</td><td>Construction</td><td>Monday – Friday
Saturday - Sunday</td><td>7 am - 5 pm
8 am - 5 pm</td></tr>
<tr><td></td><td>Operation</td><td>Monday – Friday Saturday
Sunday</td><td>5 am - 5 pm
6 am - 5 pm
8 am - 5 pm</td></tr>
<tr><td></td><td>Other operations[1]</td><td>Monday – Sunday</td><td>Anytime</td></tr>
<tr><td>GO Facility</td><td>Construction</td><td>Monday – Friday
Saturday - Sunday</td><td>7 am - 5 pm
8 am - 5 pm</td></tr>
<tr><td></td><td>Operation</td><td>Monday – Friday
Saturday - Sunday</td><td>6 am - 5 pm
8 am - 5 pm</td></tr>
<tr><td></td><td>Other operations[2]</td><td>Monday – Sunday</td><td>Anytime</td></tr>
</table></td></tr>
<tr><td>Notes:
(1) Other landfilling operations includes only security guard control, machinery maintenance and/or repairs, site infrastructure maintenance and/or repairs (landfill gas and leachate), and emergency management activities related to site safety, emergency repairs and site infrastructure repairs</td><td></td><td></td><td></td><td></td></tr>
<tr><td>(2) Other GO operations includes only repair works, machinery maintenance and repairs, loading tunnels, final product preparation manufacture (but does not include shredding) and emergency management activities related to site safety, emergency repairs and site infrastructure repairs. Unloading tunnels is only permitted during the hours of operations listed under ‘GO Facility – Operation’ in Table 2.</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Operational Noise Limits</td><td>DEVELOPMENT PHASE</td><td>STATUS</td><td>MONITORING METHODOLOGY</td><td>EVIDENCE AND COMMENTS</td></tr>
<tr><td>C54. The Applicant must ensure noise from the site does not exceed the noise limits in Table 3.</td><td>Operational</td><td>Compliant</td><td>No excessive noise generated.</td><td>Annual noise survey undertaken.</td></tr>
</table>

Table 3: Noise Limits dB(A)

No.	Location	Day	Evening	Night	Night
		$L_{eq(15min)}$	$L_{eq(15min)}$	$L_{eq(15min)}$	$L_{1(1min)}$
R1	Engadine	35	35	35	45
R2	Barden Ridge	35	35	35	45
R3	Menai	35	35	35	45
R6	Gandangara	37	37	37	45
R7	Gandangara North	35	35	35	45
R8	The Ridgeway	35	35	35	35

Note: To identify a noise receiver location, refer to the figure in Appendix E.				
Noise generated on the site is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the EPA's NSW Industrial Noise				
Noise Management	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
C55. The Applicant must implement the noise management measures described in the OEMPs for the LHRRP and GO Facility to ensure noise from the site complies with the limits in Table 3.	Operational	Compliant	Select Civil Daily Site inspections for landfill. GO not triggered.	Annual noise survey undertaken in December 2023
Noise Monitoring	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
C56. The Applicant must monitor noise from the site to demonstrate compliance with the noise limits in Table 3. The monitoring must be: undertaken annually, or to address genuine noise complaints that are related to the site as determined by the EPA or the Planning Secretary; in accordance with the NSW Industrial Noise Policy, and reported to the EPA and the Planning Secretary within one month of completing the monitoring, including details of management actions taken and the effectiveness of the actions to address any exceedances of the limits in Table 3.	Operational	Compliant	Select Civil Daily Site inspection and 3rd party consultant engaged to complete Noise Monitoring.	Annual noise survey undertaken.
LITTER & PEST CONTROL	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
C57. The Applicant must:				
(a) ensure all waste loads are covered;	Operational	Compliant	Weighbridge operators inspect loads.	Visual inspection upon arrival
(b) inspect and clear the site (and if necessary, surrounding area) of litter arising from the Development on a daily basis; and	Operational	Compliant	Select Civil Daily Site inspections.	Inspection Reports.
(c) maintain the site in a clean and tidy state at all times.	Operational	Compliant	Select Civil Daily Site inspections and litter pickets regularly engaged.	Inspection Reports.
C58. The Applicant must:				
(a) implement measures to manage pests, vermin and declared noxious weeds on site; and	Operational	Compliant	Routine exterminator inspections and baiting.	Pest exterminator reports.
(b) inspect the site routinely to ensure the measures are effective, and pests, vermin or noxious weeds are not present on site in sufficient numbers to pose an environmental hazard or cause the loss of amenity in the surrounding area.	Operational	Compliant	Routine exterminator inspections and baiting	Pest exterminator reports.

Note: For the purposes of this condition, noxious weeds are those species subject to an order declared under the Noxious Weed Act 1993.				
HERITAGE	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
Unexpected Finds Protocol				
C59. If Aboriginal objects are uncovered during construction, work in the immediate area must stop and the Regional Operations Group of the EHG Council and the Registered Aboriginal Parties are to be consulted.	Not Triggered	Not Triggered	N/A	N/A
C60. If any archaeological relics are uncovered during the course of the work, then all works must cease immediately in that area and the EHG Heritage Branch contacted. Depending on the possible significance of the relics, an archaeological assessment and an excavation permit under the NSW Heritage Act 1977 may be required before further works can continue in that area.	Not Triggered	Not Triggered	N/A	N/A
Site Impact Recording	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
C61. Within one month of the date of this consent, the Applicant must submit Site Impact Recording TfNSW to EHG for the four previously impacted Aboriginal heritage sites, AHIMS 52-2-1108, 52-2-1029, 52-2-1030 and 52-2-1031, as described in the EIS.	Pre-Construction	Compliant	Site has been inspected no further action required.	These were submitted to OEH Heritage 7 April 2017.
FIRE PREVENTION & MANAGEMENT	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
C62. The Applicant must:				
(a) design and construct the GO Facility buildings to meet the fire safety requirements of the BCA; and	Not Triggered	Not Triggered	N/A	N/A
(b) maintain a 10-metre-wide Asset Protection Zone around the northern and western sides of the GO Facility buildings.	Not Triggered	Not Triggered	N/A	N/A
C63. The Applicant must prepare an Emergency Response Plan for the site detailing procedures to be implemented in the event of a fire on or near the site. The Emergency Response Plan must:				
(a) be prepared by a suitably qualified and experienced expert in consultation with Council and the NSW Rural Fire Service;	Operational	Compliant	Annual Review of ERP.	Operations Office.
(b) be submitted to the Planning Secretary within three months of the date of this consent, or an alternative timing as otherwise agreed with the Planning Secretary; and	Operational	Compliant	Revised ERP approved by DPIE on 4/11/2022.	Operations Office.
(c) detail emergency access and egress routes, including an alternative access route, escape routes, refuge areas, assembly points and evacuation procedures.	Operational	Compliant	Annual Review of ERP.	Operations Office.
SCHEDULE D				
ENVIRONMENTAL MANAGEMENT, REPORTING, AUDITING AND COMMUNITY ENGAGEMENT	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
ENVIRONMENTAL MANAGEMENT				
Construction Environmental Management Plan				
D1. The Applicant must prepare a Construction Environmental Management Plan (CEMP) for the Development, to the satisfaction of the Planning Secretary. The Plan must:	Pre-construction	Compliant and Not Triggered	CEMP for Dual Leachate and Gas Trench submitted to DoP on 17.7.18. CEMP for GO approved by DPIE on	

			13/9/2021.	
(a) be prepared in consultation with Council and be approved by the Planning Secretary prior to construction of the Development;	Pre-construction	Compliant	SSC comments included in the CEMP.	
(b) identify the statutory approvals that apply to the site;	Pre-construction	Compliant	N/A	N/A
(c) outline all environmental management practices and procedures to be followed during construction;	Pre-construction	Compliant	N/A	N/A
(d) describe all activities to be undertaken on the site during construction, including a dear indication of construction stages;	Pre-construction	Compliant	N/A	N/A
(e) detail how 'the environmental performance of the construction works will be monitored, and what actions will be taken to address identified adverse environmental impacts;	Pre-construction	Compliant	N/A	N/A
(f) describe the roles and responsibilities for all relevant employees involved in construction works; and	Pre-construction	Compliant	N/A	N/A
(g) include the management plans under Condition D2 of this consent.	Pre-construction	Compliant	N/A	N/A
D2. As part of the CEMP for the Development, required under Condition D1 of this consent, the Applicant must include the following:	Pre-construction	N/A	N/A	N/A
(a) a construction management plan for the dual gas and leachate trench prepared in consultation with EPA (Condition C23);	Operational	Compliant	Site inspections, management meeting with Select Civil.	Approval from DoP.
(b) an erosion and sediment control plan;	Operational	Compliant	N/A	N/A
(c) a vegetation and fauna management plan (Condition C43); and	Operational	Compliant	N/A	N/A
(d) a construction traffic management plan (Condition C48).	Operational	Compliant	N/A	N/A
D3. The Applicant must carry out construction of the Development in accordance with the CEMP approved by the Planning Secretary and as revised and approved by the Planning Secretary from time to time), unless otherwise agreed by the Secretary.	Operational	Compliant	For leachate and gas cutoff trench: Site inspections, management meeting with Select Civil. For the Organics area: site inspection, management meeting with Morris Civil.	Approval from DoP.
Operational Environmental Management Plan	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
D4. The Applicant must amend the draft Operational Environmental Management Plan (OEMP) for the Landfill, GO Facility, to the satisfaction of the Planning Secretary. The Plans must:	Pre-construction	Compliant and Not Triggered for GO Facility	The LHRRP OEMP, dated 13.10.17 and relates to activities associated with landfilling and re-profiling. GO Facility has not been installed, DPE approved this staged preparation of the OEMPs in a letter dated 22.02.18. Revised landfill OEMP submitted on	N/A

			4/11/2021.	
(a) be prepared in consultation with Council and be approved by the Planning Secretary prior to operation of the Development;	Pre-construction	Compliant	The OEMP was submitted to the DPE via email on the 23.08.17. Revised landfill OEMP submitted on 4/11/2021.	N/A
(b) identify the statutory approvals that apply to the site;	Pre-construction	Compliant	The OEMP states that it has been prepared to address the following statutory requirements: SSD 6835; EPL 5065; ANSTO Lease; VPA.	N/A
(c) outline all environmental management practices and procedures to be followed during operation:	Pre-construction	Compliant	The OEMP includes a number of sections on the environmental management of the Site including surface water, leachate, landfill gas, odour, dust, litter, noise, weeds, traffic, and emergency preparedness.	Site Records, EPA Annual Returns.
(d) detail how the environmental performance of the Development will be monitored, and what actions will be taken to address identified adverse environmental impacts; and	Pre-construction	Compliant	Daily site inspections, Environmental Monitoring as per EPL.	Site Records, EPA Annual Returns.
(e) include the management plans under Condition D5 of this consent.		Compliant	OEMP for overtopping approved by DPIE. OEMP for GO not triggered.	
(f) incorporate the measures identified in the Modification Assessments in accordance with the timing specified in Condition D8(d).	Not Triggered	Not Triggered		
D5. As part of the OEMP's for the Development, required under Condition D4 of this consent, the Applicant must include the following:				
(a) site air quality and odour management plan (Condition C11);	Pre-construction	Compliant	Odour Patrols, Dust Monitoring, Site inspections.	Records held in operations office.
(b) detailed design of the surface management at the GO Facility (Condition C32);	Not Triggered	Not Triggered	N/A	N/A
(c) aquatic habitat monitoring plan (Condition C33);	Not Triggered	Not Triggered	N/A	N/A
(d) Mill Creek stream rehabilitation, stabilisation and vegetation management plan (Condition C34);	Not Triggered	Not Triggered	N/A	N/A
(e) groundwater management plan (Condition C35); and	Not Triggered	Not Triggered	N/A	N/A
(f) emergency response plan (Condition C63).	Operational	Compliant	Refer to C35	N/A
D6. The Applicant must operate the Development in accordance with the OEMP's approved by the Planning Secretary (and as revised and approved by the Planning Secretary from time to time), unless otherwise agreed by the Planning Secretary.	Operational	Compliant	OEMP in operation	OEMP in operation
Management Plan Requirements	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**

D7. The Applicant must ensure the Management Plans required under this consent are prepared in accordance with any relevant guidelines, and include: (a) detailed baseline data; (b) a description of: the relevant statutory requirements (including any relevant approval, licence, or lease conditions); any relevant limits or performance measures/criteria; and the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the Development or any management measures; (c) a description of the measures that will be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria; (d) a program to monitor and report on the: impacts and environmental performance of the Development; and effectiveness of any management measures (see (c) above); (e) a contingency plan to manage any unpredicted impacts and their consequences; (f) a program to investigate and implement ways to improve the environmental performance of the Development over time; (g) a protocol for managing and reporting any: incidents; complaints; non- compliances with statutory requirements; and exceedances of the impact assessment criteria and/or performance criteria; and a protocol for periodic review of the plan. Note: The Planning Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans. (h) A protocol for periodic review of the plan	Operational	Compliant	CWY Systems Audits, BSI Certification Audits.	BSI Certification.
Revisions to Strategies, Plans and Programs	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
D8. Within three months of:				
(a) an audit submitted under Condition D12;	Not Triggered	Not Triggered	N/A	N/A
(b) an incident report under Conditions D10 and D11;	Not Triggered	Not Triggered	N/A	N/A
(c) an annual review under Condition D9; and/or	Not Triggered	Not Triggered	N/A	N/A
(d) a modification to this consent,	Operational	Compliant	Change of operation hours. Mod 2 approved on 23 November 2023. 6 months to revise all plans	N/A
The Applicant must review, and if necessary, revise the strategies, plans, and programs required under this consent to the satisfaction of the Planning Secretary. Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the site.	N/A	N/A	N/A	N/A
REPORTING	**DEVELOPMENT**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**

	PHASE			
Annual Review				
D9_ By the end of each calendar year, and annually thereafter, the Applicant must review the environmental performance of the site, to the satisfaction of the Planning Secretary. This review must:	Operational	Compliant	Preparation and submission of the report is managed by the Cleanaway Due Diligence Calendar.	Internal audit prepared submitted to DoP and placed on public Website.
Be submitted to the Planning Secretary by the end of February each year	Operational	Compliant	This AEMR.	AEMR submitted via Planning Portal.
Describe the operations that were carried out in the past year	Operational	Compliant	Section 3	N/A
Analyse the monitoring results and complaints records of the site over the past year, including a comparison of these results against the: Relevant statutory requirements, limits, or performance measures/criteria Monitoring results of previous years Predictions in the EIS;	Operational	Compliant	Section 6-9	N/A
Identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance	Operational	Compliant	Section 2	N/A
Identify any trends in the monitoring data	Operational	Compliant	Section 6-9	N/A
Identify any discrepancies between the impacts predicted in the EIS and the actual impacts of the site and analyse the potential cause of any significant discrepancies; and	Operational	Compliant	Section 6-9	N/A
Describe what measure will be implemented over the next year to improve the environmental performance of the site	Operational	Compliant	Section 11	N/A
Incident Reporting	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
D10. Upon detecting an exceedance of the limits/performance criteria in this consent or the occurrence of an incident that causes (or may cause) material harm to the environment, the Applicant shall immediately (or as soon as practical thereafter) notify the Secretary and any other relevant agencies of the exceedance/incident.	Operational	Compliant	No exceedances of the limits/performance criteria occurred for the reporting period of 2023.	N/A
D11 Within seven days of the date of the incident, the Applicant: must provide the Planning Secretary and any relevant agencies with a detailed report on the incident. and such further reports as may be requested.	Operational	Compliant	Report submitted on 18/02/2022.	N/A
INDEPENDENT ENVIRONMENTAL AUDIT	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
D12. Within one year of the date of this consent, and every three years thereafter, unless the Planning Secretary directs otherwise, the Applicant must commission and pay the full cost of an Independent Environmental Audit of the site. The audit must: be carried out by a suitably qualified, experienced and independent audit team whose appointment has been endorsed by the Planning Secretary; assess the environmental performance of the site, and its effects on the	Operational	Compliant	Preparation and submission of the report is managed by the Cleanaway Due Diligence Calendar. An Independent Audit was prepared by AECOM and Submitted to the Department in 2021. The next audit will be done in May 2024.	N/A

surrounding environment; determine whether the site is complying with the relevant standards, performance measures and statutory requirements; review the adequacy of the Environmental Management Plans for the site, compliance with this consent, and any other licences and consents; and, if necessary, recommend measures or actions to improve the environmental performance of the site, and/or any plan/program required under this consent.				
D13. Within three months of commissioning the audit, or as otherwise agreed by the Planning Secretary, the Applicant must submit a copy of the audit report to the Planning Secretary with a response to all recommendations contained in the audit report.	Operational	Compliant	As above.	Report submitted to DoP.
COMMUNITY ENGAGEMENT	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
Community Reference Group				
D14. The Applicant must establish and maintain a Community Reference Group (CRG) to maintain regular communication with the local community regarding activities on the site, any environmental impacts, monitoring results and management actions. The CRG must include representatives from the local community, recreational and sporting clubs, ANSTO, Council and the Applicant. The CRG must meet on a quarterly basis.	Operational	Compliant	Due Diligence Calendar.	Meeting Records.
Access to Information	**DEVELOPMENT PHASE**	**STATUS**	**MONITORING METHODOLOGY**	**EVIDENCE AND COMMENTS**
D15. The Applicant must make the following information publicly available on its website and keep the information up to date. (a) the EIS, RTS, CEMP and OEMPs; (b) current statutory consents, approvals and licences for the site; (c) approved strategies, plans and programs; (d) a summary of all monitoring data for the site as required under this consent; (e) a complaint register, updated on an annual basis; (f) Annual Reviews, Independent Environmental Audits and the Applicant's response to the recommendations; and (g) any other matter required by the Planning Secretary.	Operational	Compliant	Annual Review of Consent.	Document can be viewed at: https://www.cleanaway.com.au/about-us/environmental-management/

5. Independent Environmental Audit (IEA) report 2021, Non – Conformance Close Out

From the Independent Environmental Audit of the Project Approval and Environment Protection Licences, which was undertaken in 2021 a total of 98 conditions were assessed, with 11 Non-Conformances as below.

Title Condition Number	Auditors Recommendations	Action Required	Status
SSD 6835, B6	**2021 IEA REC 12** Implement processes to periodically review / track the cumulative quantity of waste received throughout the calendar year to ensure tonnages prescribed in CoC B6 are not exceeded	The amount of waste received at the drop off area to be reviewed / tracked monthly.	Implemented and Ongoing.
SSD 6835, B10	**2021 IEA REC 13** Implement recommendations in the BCA Advice report prepared by Concise Certification, dated 2 June 2021	Obtain BCA certification	Certification obtained on 2 September 2021.
SSD 6835, C8	No recommendations required	N/A	N/A
SSD 6835, C11A	**2021 IEA REC 14** Update AQOMP in accordance with Condition 11A and submit to DPIE	Update AQOMP	Revised report submitted and approved by DPIE on 4 November 2021.

Title Condition Number	Auditors Recommendations	Action Required	Status
SSD 6835, C36	**2021 IEA REC 15** Obtain DPIE approval of alternative bore locations	To submit consent modification	DPI Water approved the installation of new bores rather than re-establishing the old bores. Installation of new bores completed in 2017. Consent MOD 2 submitted on 21 December 2022
SSD 6835, C37	**2021 IEA REC 04** Review liquid storage at the Select Civil Workshop area and ensure adequate bunding is provided	To review liquid storage at the workshop	Review completed and in compliance with the requirements
SSD 6835, C49	**2021 IEA REC 16** Obtain TfNSW (RMS) approval of the Intersection Safety Review for 2020	To submit request to TfNSW	TfNSW confirmed that they would provide comments only, not approval.
SSD 6835, D8	**2021 IEA REC 17** Implement a process to ensure management plans are reviewed (and revised if necessary) following a reportable incident, Annual Review and/or Modification to the consent. Ensure the review process is documented, in particular where plans are reviewed but do not require revision.	To implement a process for the review of management plans	Actions raised in Myosh

Title Condition Number	Auditors Recommendations	Action Required	Status
SSD 6835, D10	**2021 IEA REC 18** Implement a process to ensure the Department is notified immediately of any exceedance of trigger values or limits	To notify DPIE immediately for any exceedance of trigger values and limits	Ongoing
SSD 6835, D12	**2021 IEA REC 19** Ensure IEAs are conducted within 3 years	To conduct IEAs every 3 years	Ongoing – Next IEA due in 2024
SSD 6835, D15	**2021 IEA REC 20** Ensure all the documents required by Condition D15 are uploaded onto the Cleanaway website	To upload all documents to the Cleanaway website	Completed. Please refer to link: https://www.cleanaway.com.au/about-us/environmental-management/

6. Environmental Incident Reports

The following table includes Incidents which occurred during 2023.

Title	Incident Date	Agencies notified	Regulatory outcomes	Did a non-compliance occur?	Details	Measures Implemented
Nil	*No environmental incidents occured for the reporting period of 2023*					

7. Complaints

Cleanaway receives environmental complaints from the following sources:

- Direct complaint from a member of public.
- Environmental Reporting Hotline operated 24 hours 7 days a week.
- Environmental Protection Authority (EPA).

A total of 9 odour complaints and 2 noise complaints were received during 2023, giving a total of 11 complaints for 2023.

Incident Date	Reported Date	Type	Address	Location	Status	Details
25/02/2023	27/02/2023	Odour	Not provided	Barden Ridge	Completed	An odour complaint was received from the EPA on behalf of a resident in Barden Ridge for the 25/02/2023 at around 7am.
07/03/2023	07/03/2023	Odour	Not provided	Barden Ridge	Completed	An odour complaint was received on 7/03/2023 at 5am from a resident in Barden Ridge, rotten rubbish odour.
16/03/2023	20/03/2023	Odour	Not provided	Barden Ridge	Completed	Odour complaint received on the 20/03/2023 from a resident from Barden Ridge, garbage odour in the mornings.
22/03/2023	22/03/2023	Noise	22 Windle Place Menai	Menai	Completed	A noise complaint was received from a resident in Menai on 22/03/2023 around 7:30am.
30/03/2023	31/03/2023	Odour	Not provided	Menai	Completed	Odour complaint received from Menai resident for the 30/03/2023 at approximately 10:40PM, strong garbage smell.
01/05/2023	02/05/2023	Odour	Namatjira St, Barden Ridge	Barden Ridge	Completed	Odour complaint received from a community member at Namatjira St, Barden Ridge on 1/05/2023, garbage odour particularly bad in the mornings and evenings.
08/05/2023	10/05/2023	Odour	Namatjira St, Barden Ridge	Barden Ridge	Completed	A resident from Barden Ridge reported a strong odour from Monday (8/05) at approx. 9PM.
06/07/2023	06/07/2023	Noise	Windle Place, Barden Ridge	Barden Ridge	Completed	A noise complaint was received from the EPA on behalf of a resident at Windle Place, Barden Ridge on 6/07/2023.
18/07/2023	18/07/2023	Odour	Not provided	Not provided	Completed	NSW EPA received a number of odour complaints from residents alleging odours from Lucas Heights.
31/07/2023	01/08/2023	Odour	Hall Drive, Menai	Menai	Completed	Odour complaint from resident in Menai made on 31/7, rubbish/food waste odour noticed around 7:00pm.
03/08/2023	03/08/2023	Odour	Not provided	Engadine	Completed	An odour complaint was made by a resident on the western edge of Engadine to the EPA for 3/08/2023 at 7AM.

All complaints received were logged within the site complaints register and within the Cleanaway MYOSH Safety Management Software. Following receiving a complaint it is investigated to determine the validity, actions are assigned to improve performance and feedback is provided.

Figure 1. Complaints by locations - 2023

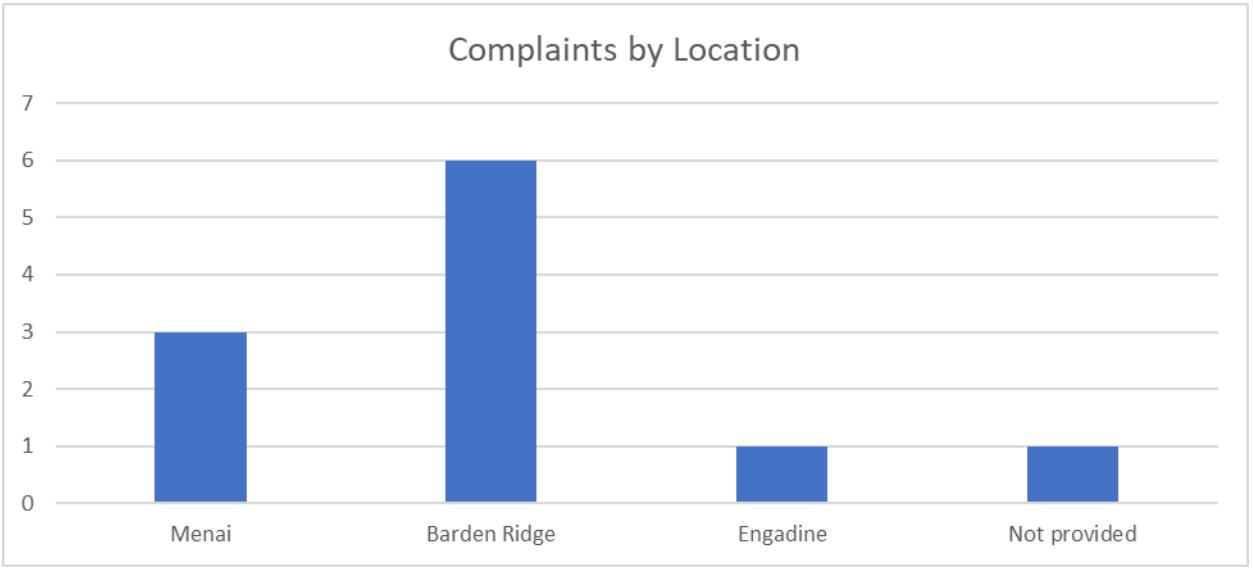
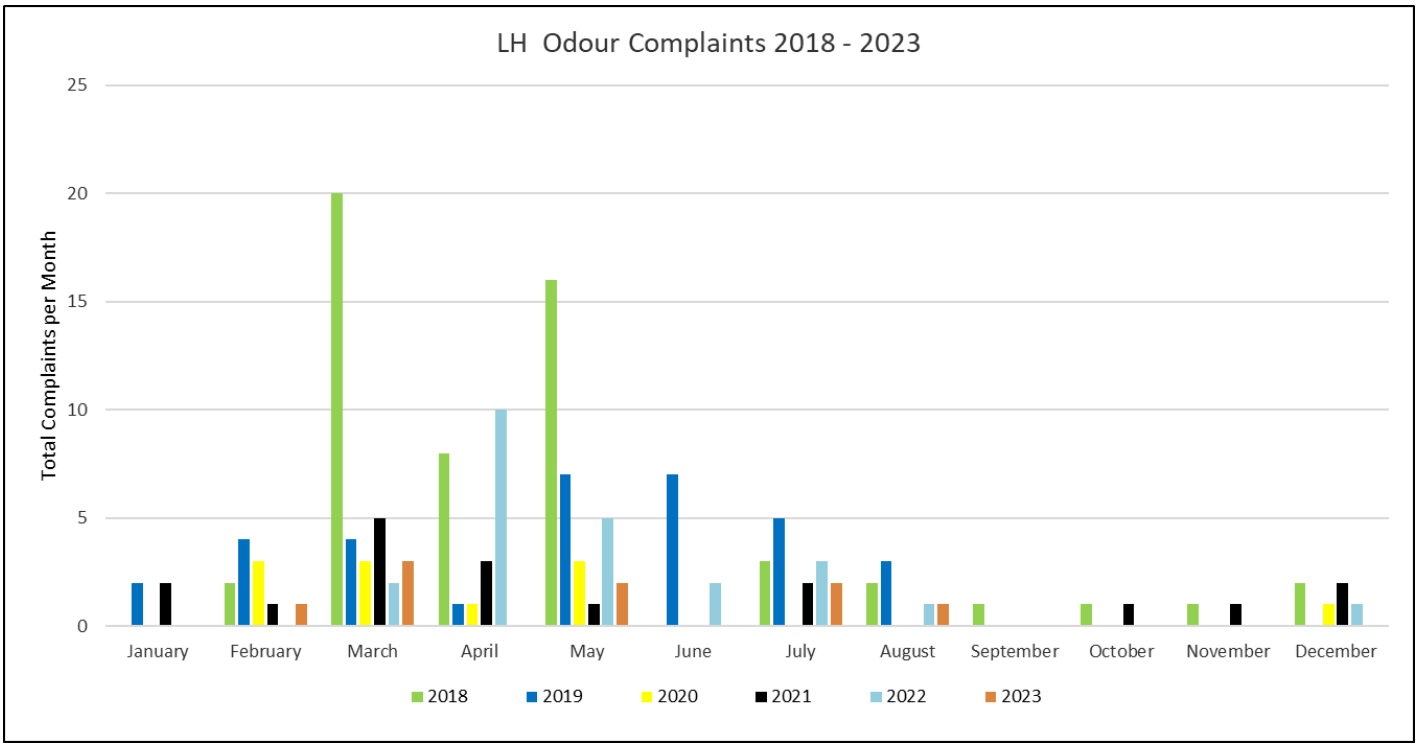


Figure 3. Odour Complaints 2019-2023



8. Assessment Criteria

This AEMR has been undertaken in accordance with Development Consent SSD 6835, Condition D9 and the following associated licences and/or Management Plans:

- DA SSD 6835, EPL 5065, ERP OEMP, PIRMP, AQOMP, GMP, Surface and sub surface gas monitoring plan, TMP, CRG, and VPA.

9. Environmental Monitoring

9.1. Landfill Gas Management

9.1.1. Subsurface Gas

A monitoring program was submitted to the NSW EPA in 2006. The program has since been accepted and referenced in the EPL 5065 section M8.2.

Subsurface Gas Monitoring is therefore conducted in accordance with EPL Section P1.1. Any exceedances above 1.25% volume/volume are reported to the NSW EPA within 24 hours of results being received. Note, the exceedance level was lowered to 1% (v/v) methane on 7 December 2017.

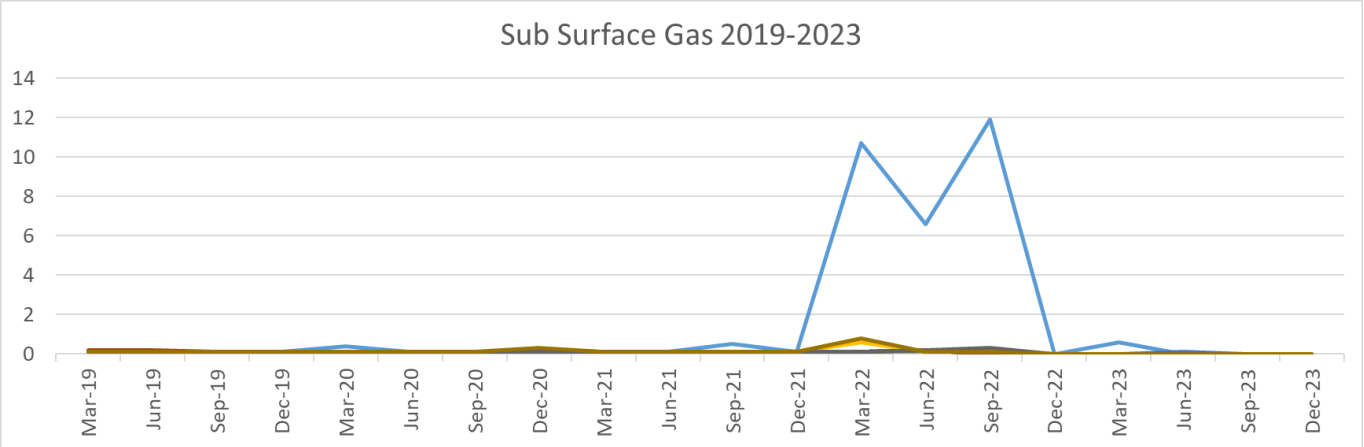
Subsurface Gas Monitoring Results for 2023

	Mar-2023	Jul-2023	Sep-2023	Dec-2023	Min	Av	Max
MB036	<0.1	<0.1	0	0	0	0	0
MB037	0.6	<0.1	0	0	0	0.2	0.6
MB036-1	<0.1	<0.1	0	0	0	0	0
MB037-1	<0.1	<0.1	0	0	0	0	0
MB042	<0.1	0.1	0	0	0	0.0.33	0.1
MB043	<0.1	0	0	0	0	0	0
MB046	<0.1	<0.1	0	0	0	0	0
MB047	<0.1	<0.1	0	0	0	0	0
MB048	<0.1	<0.1	0	0	0	0	0
MB049	<0.1	<0.1	0	0	0	0	0

All results in percentage (%).

Results Analysis:

All subsurface methane results recorded for the monitoring period of 2023 were below the NSW EPA license limit of 1% volume/volume. All subsurface gas bore results were negligible for 2023.



9.1.2. Surface Gas

Surface landfill gas emissions are monitored quarterly in accordance with the Landfill Gas Surface Monitoring Program February 2006 and EPL 5065 Section M8.1. Monitoring was undertaken by the contractor WSP - Golders from January 2023- September 2023, and by the Environmental Technician from October 2023- December 2023.

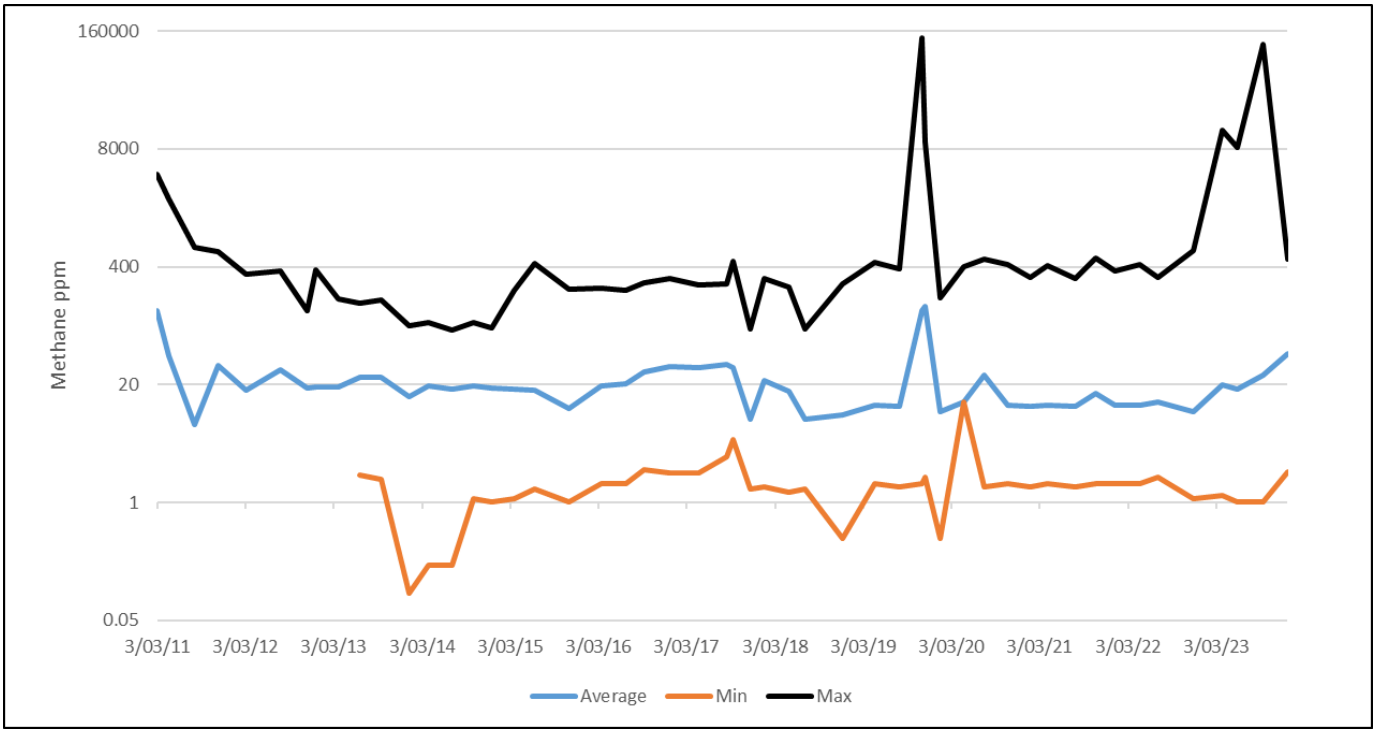
Samples of the atmosphere are taken 5 cm above the landfill surface in a grid pattern across the site, and depressions and fissures are also targeted. The threshold for corrective action is 500 ppm of methane. If an odour is detected during the monitoring, the odour is tracked upwind to the source of the odour where it is further monitored and noted for investigation.

If any exceedance of the threshold is found, then the site contractors EDL are informed and remediation works will take place on the source of the exceedance. If the exceedance is repeated and the source is still not rectified, then more detailed investigations and monitoring will be undertaken. It is a requirement of the EPL that the NSW EPA is notified within 24 hours of a result over 500 ppm on the finished areas of the landfill.

Gas accumulation monitoring is conducted monthly to ensure landfill gas concentrations do not accumulate to unsafe levels within onsite buildings. If any exceedance of the threshold level is detected, then necessary actions are taken to mitigate and ensure the safety of staff and customers on site.

Surface Gas in 2023 was conducted in February, May, September, and December.

Minimum, Average and Maximum results for landfill surface gas across site for the period March 2012 to November 2023 -



Any areas of high methane concentration are reported to EDL for review and possible works that may be undertaken to reduce the methane concentration in these areas. This may include additional wells and/or increased suction in these areas. These are monitored on a quarterly basis and results are provided Appendix C.

9.2. Groundwater & Surface Water Monitoring

9.2.1. Surface Water

Surface Water EIS Predictions:

With the implementation of the proposed mitigation and management measures, it is not expected that the proposal would result in an unacceptable impact in terms of sediment discharge to downstream waterways.

Activities associated with the proposal would not result in a major increase in potable water demand.

Stormwater discharged from the site is not expected to have any unacceptable impacts on flooding conditions downstream.

Re-profiling and re-capping of areas would reduce the potential risk of leachate entering the surface water system hence would not deteriorate receiving water quality.

The surface water assessment addresses the SEARs and concludes that the proposal would meet the following objectives:

- No significant impacts on the community or environment
- Prevention of surface water contamination
- Minimising sediment generation and transport off the proposal site

- Minimising soil erosion
- No significant impacts to downstream flow conditions
- Maximise use of collected water on site for dust suppression, irrigation, composting,
- Maintenance of haul roads etc.
- Keep surface water drains free of litter

Surface Water Statutory Requirements:

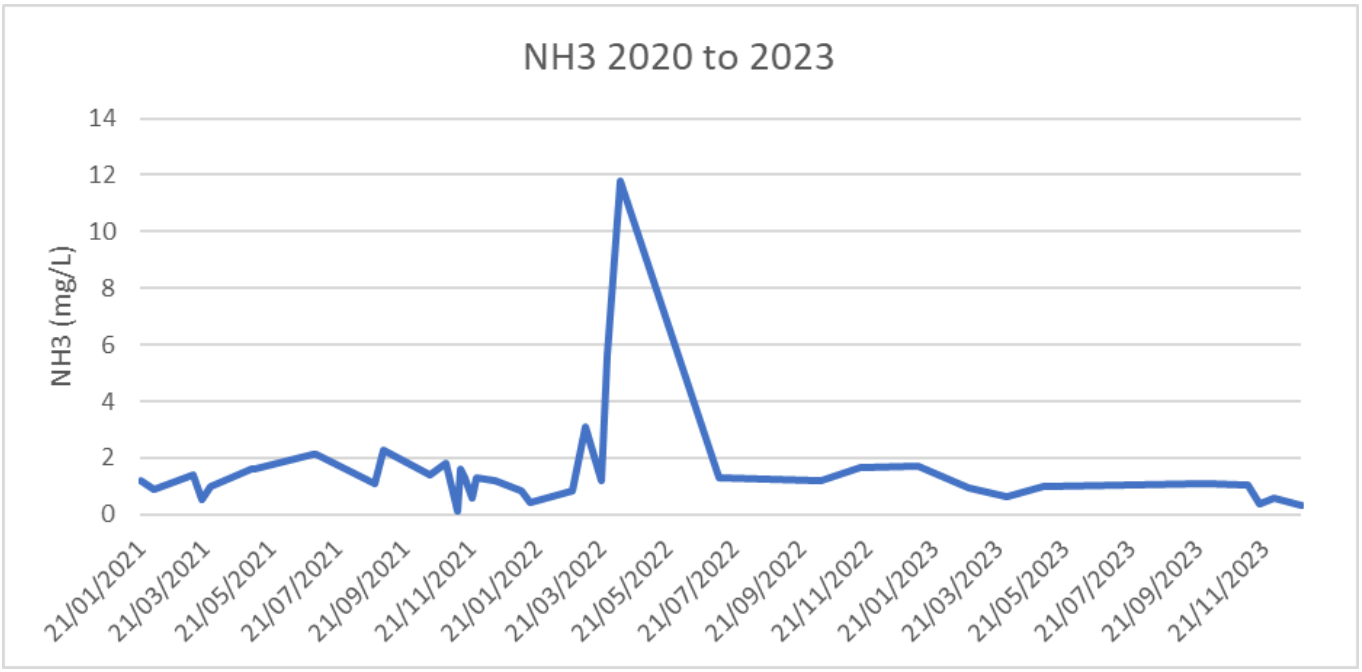
The EPL 5065 requires the collection of samples within 24 hours of a discharge at MC1.

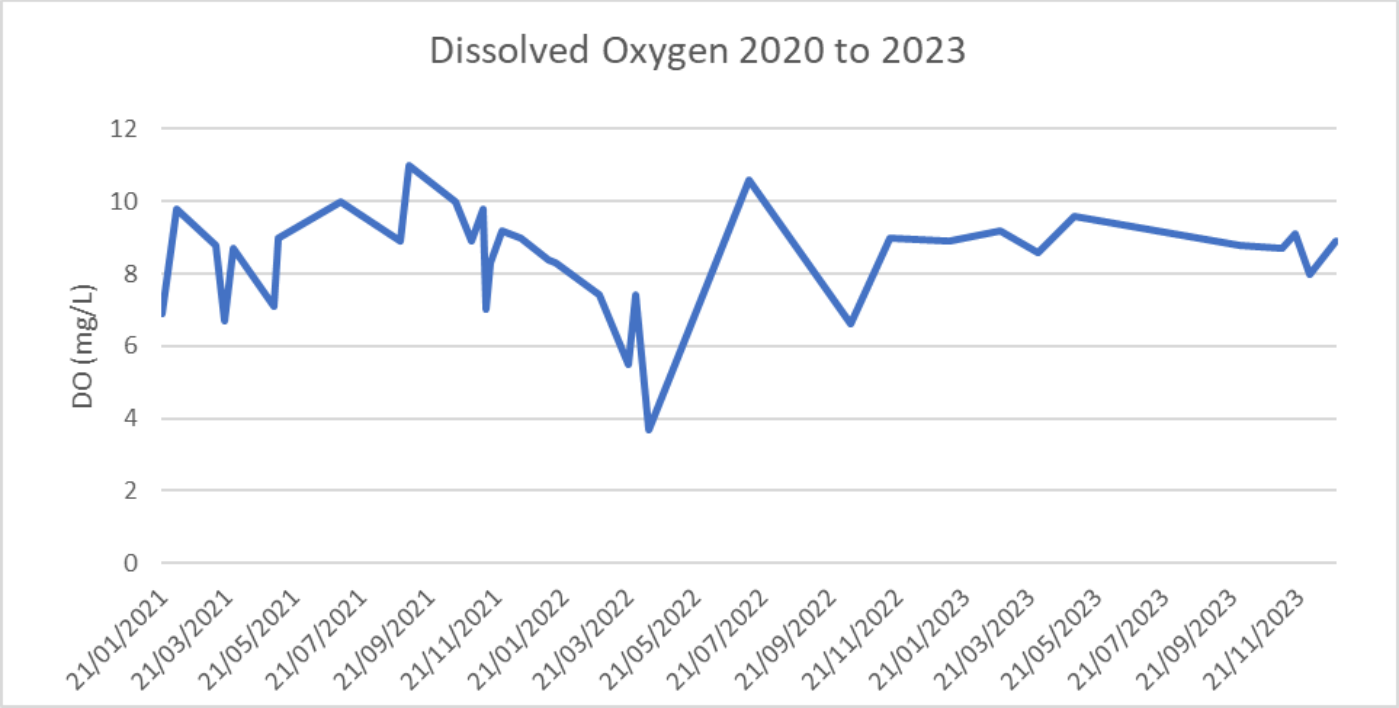
Wet weather surface water monitoring is undertaken as required by the site compliance officer and/or contractor JPG. Depending on the sample point location, wet weather samples are analysed for up to the below parameters.

Surface water samples are analysed for the following analytes:

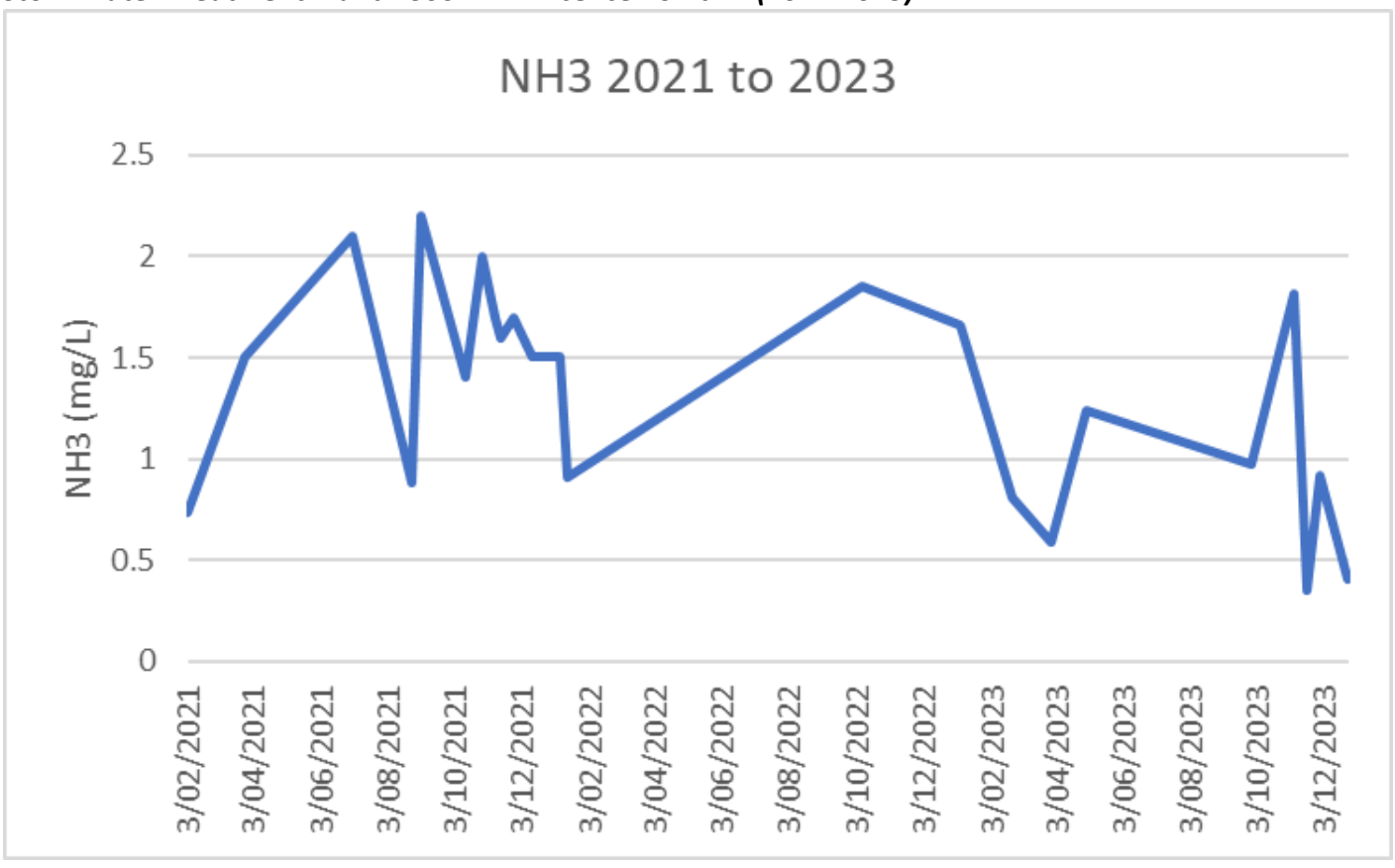
- pH (field or laboratory)
- Potassium
- Electrical Conductivity (field or laboratory)
- TSS
- TDS
- TOC
- Ammonia as N
- Dissolved Oxygen (field or laboratory)
- Phenol

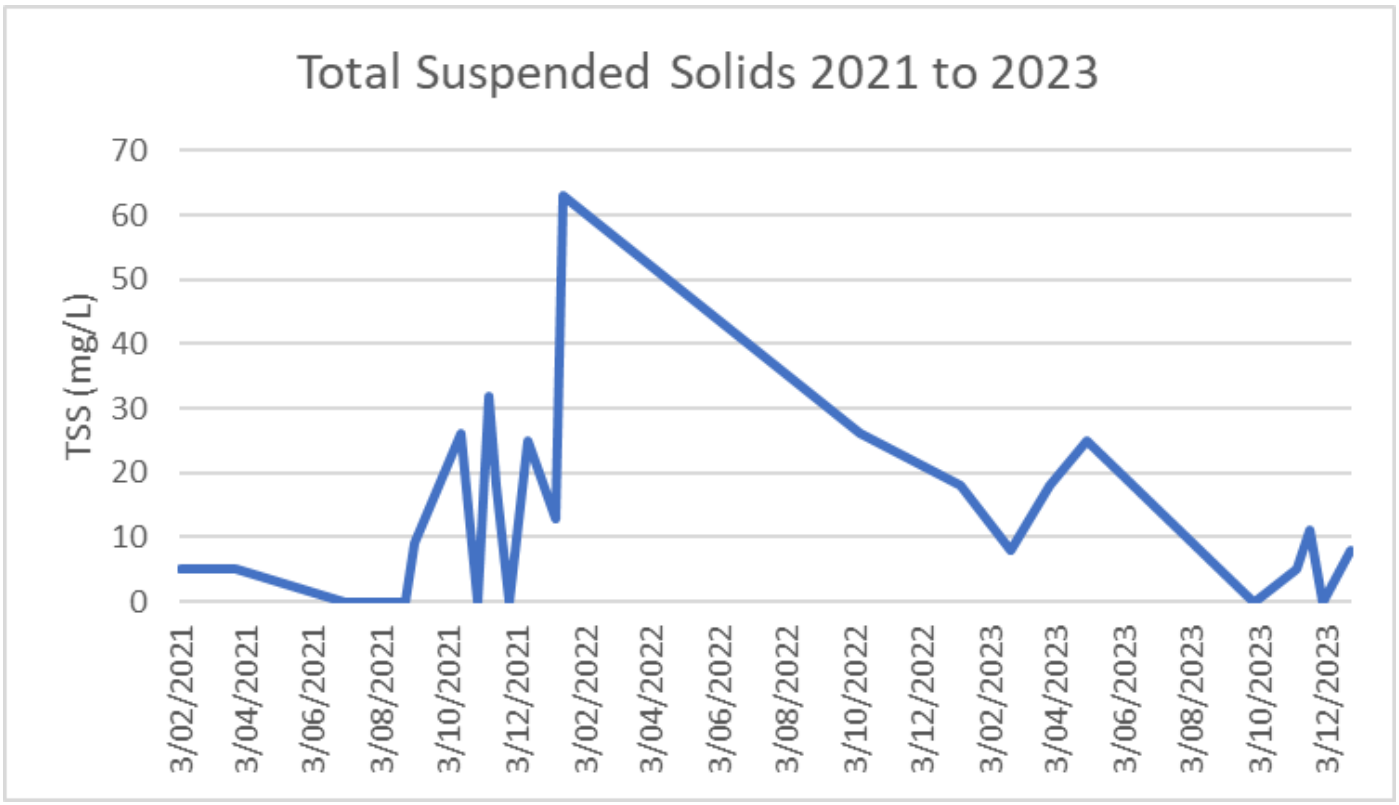
Discharge Point at Mill Creek (MC1) EPA Licence point 1 (2021-2023)



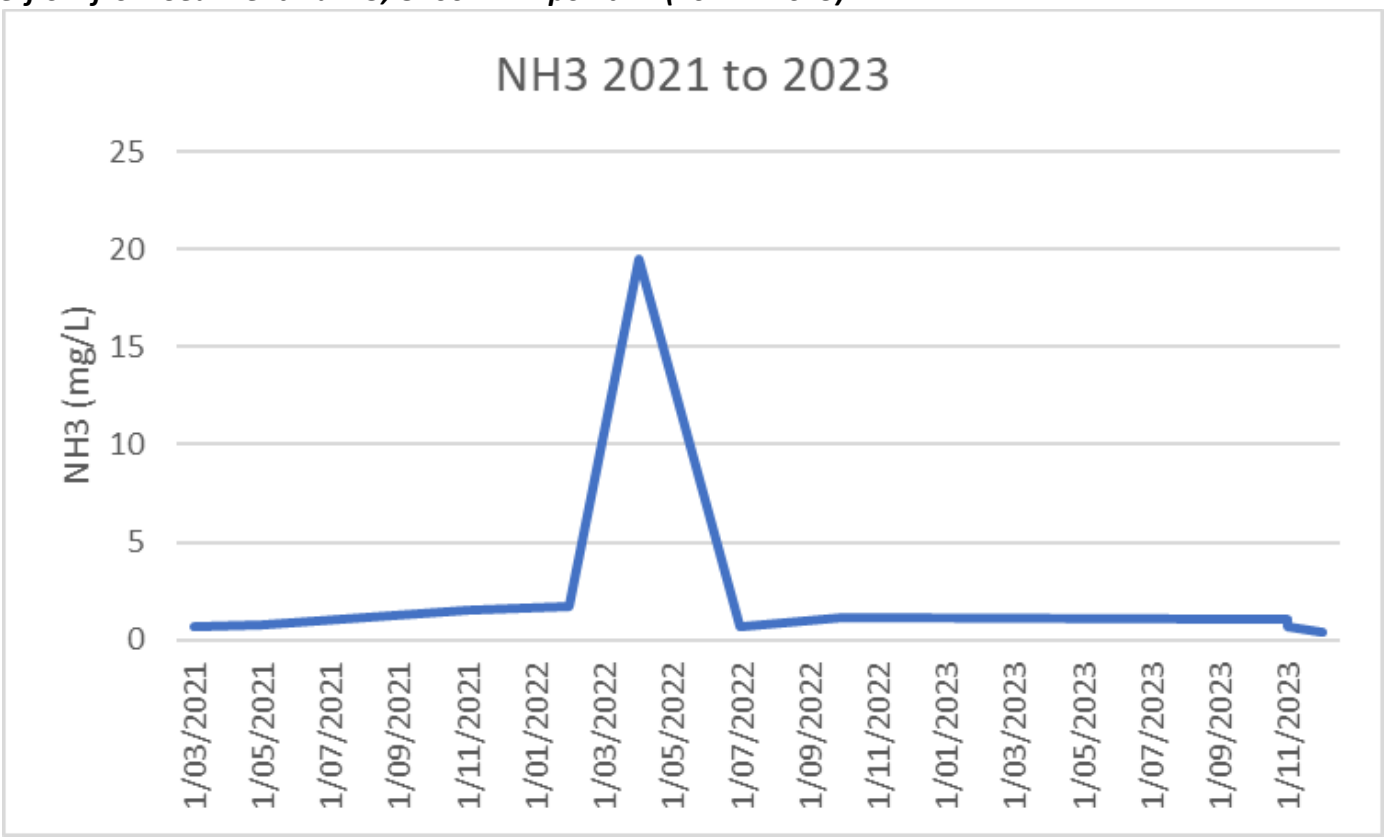


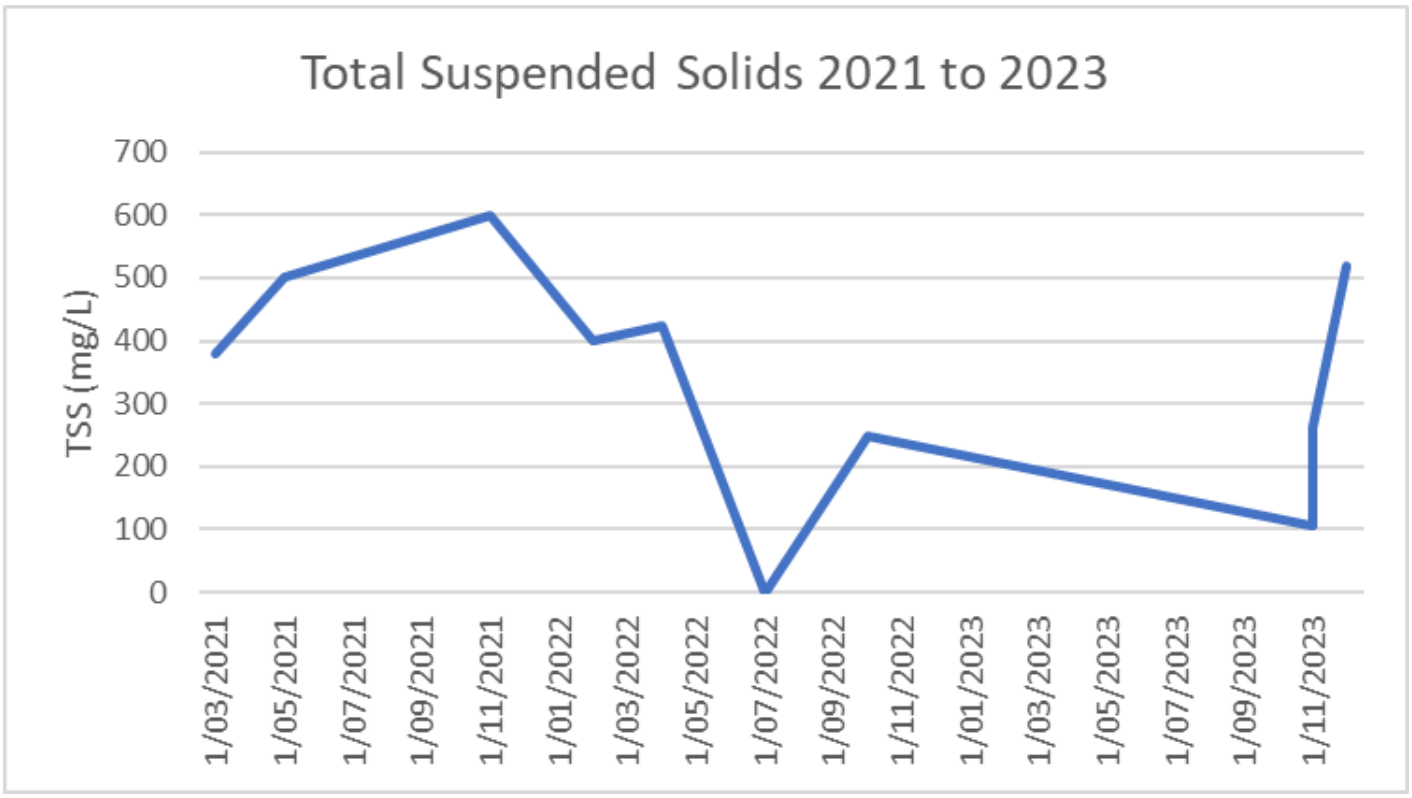
Stormwater Treatment Plant DS001 EPA Licence Point 21 (2021-2023)





Overflow from Sediment Dam 5, OF001 EPA point 22 (2021 – 2023)



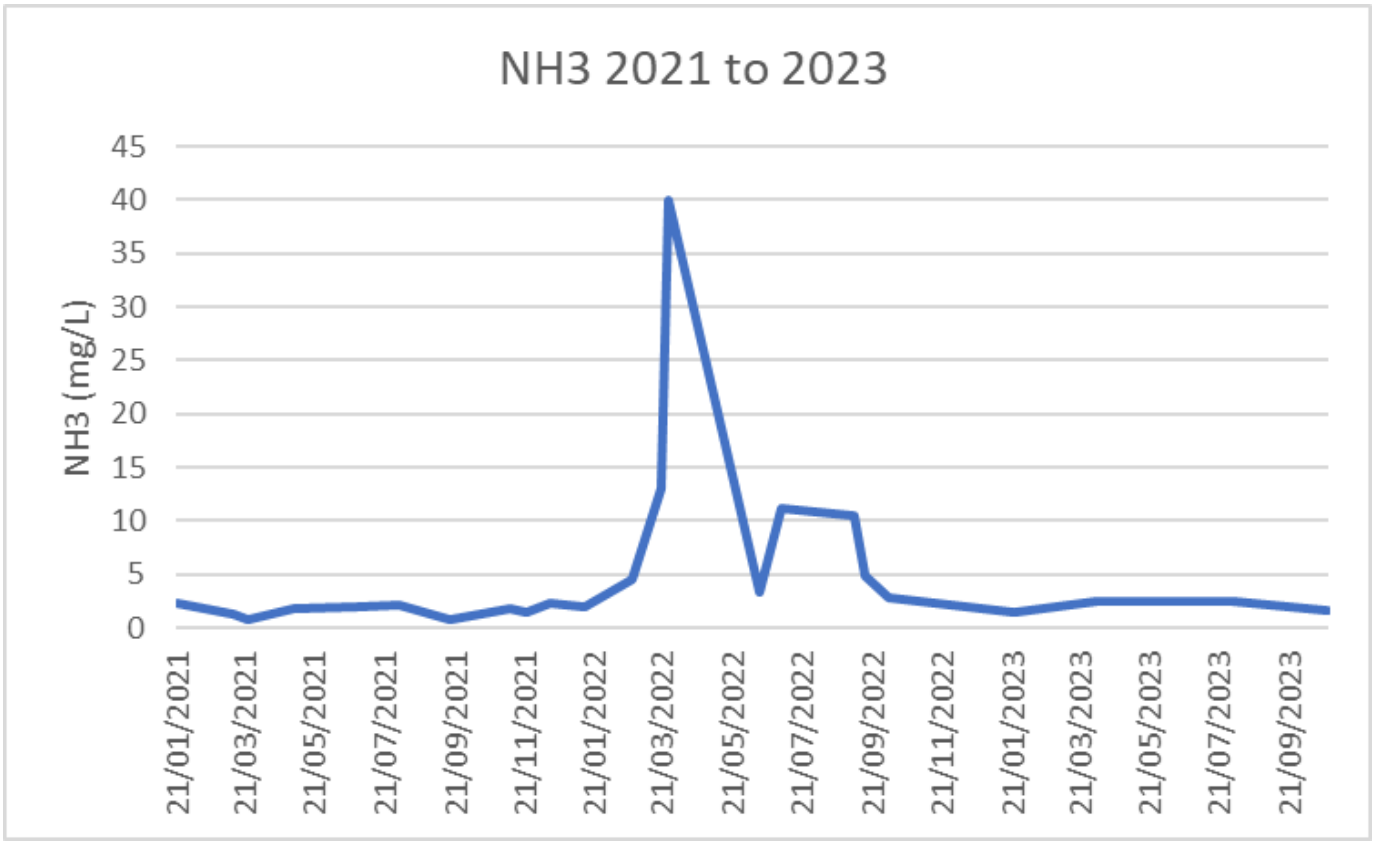


Note - From the EPA licence:

While the licence TTS limit for point 22 is 50 mg/L, condition L2.5 states the licensee is taken not to have breached the licence total suspended solids **c**oncentration limits for Point 1 and Point 22 if:

- the overflow is caused by a rainfall event; and
- the licensee has taken all practical measures to avoid and minimise water pollution.

Sediment Dam 5, SD005 EPA Licence Point 23 (2021 - 2023)



Results Analysis:

MP - MC1 (Discharge to waters) is monitored during a discharge event. The results were similar to previous years for all analytes apart from the following:

During a rainfall event the 50 mg/l suspended solids limit does not apply. There were 6 suspended solid results above 50mg/l during the year2023, due to rainfall causing more discharges (i.e. extreme weather events in 2023).

There were no ammonia results exceeding the limit of 2.5 mg/L.

In the past MC1 was sampled on a time-based frequency, leading to samples being taken during times of no flow, thus low oxygen. In line with the EPL condition samples are only taken during times when there is flow being contributed by the landfill surface area.

MP - DS001 (Pumped discharge from storm water treatment plant) is sampled when the storm water treatment plant is operating. There were no exceedances of the suspended solids and ammonia during the 2023 reporting period.

MP - OF001 (Overflow from sediment dam) is sampled within 24 hours of discharge. There were 3 discharges during the year, all had suspended solids concentration above 50mg/L. However, these events occurred during wet weather and thus the high values are not unusual and were within the licence limits (i.e. especially during sustained extreme weather conditions).

Ammonia results for the three discharge samples were below the license limit of 2.5mg/L.

MP - SD005 (Sedimentation Dam) is monitored quarterly regardless of rainfall events. There are no analyte concentration limits on this sampling point.

9.2.2. Groundwater

Groundwater EIS Predictions:

Existing groundwater monitoring data suggests that the combination of the in-situ geology and current leachate collection system is resulting in concentrations of parameters in groundwater which are below the level where impacts on the surrounding groundwater and surface water systems may occur. As similar conditions would be maintained with the proposal, it is expected that there would be no unacceptable impacts from the proposed landfilling activities at the LHRRP.

The Stage 5 landfill leachate collection system and control measures have been designed and installed in accordance with best practice to facilitate preferential capture of leachate from up gradient landfill areas and further minimise the potential for impacts to underlying groundwater. The existing groundwater drainage system located beneath Stage 5 provides additional capacity for interception of groundwater in the unlikely event that adverse groundwater impacts are detected.

The proposed reprofiling of the landform and subsequent capping is expected to reduce overall infiltration to the landfill, resulting in reduced potential for impacts on underlying groundwater and down gradient receptors.

Despite this, it is important that leachate levels within the landfill are monitored and actively managed to minimise the possibility of leachate entering groundwater.

Groundwater Statutory Requirements:

All groundwater bores are sampled on a quarterly basis by an external contractor. Analysis of all groundwater bores are consistent from year to year with no significant fluctuations of analytes.

As required by SSD 6835 C35 a Groundwater Management Plan (GMP) be prepared by a suitably qualified and experienced person, in consultation with the EPA and DPI Water.

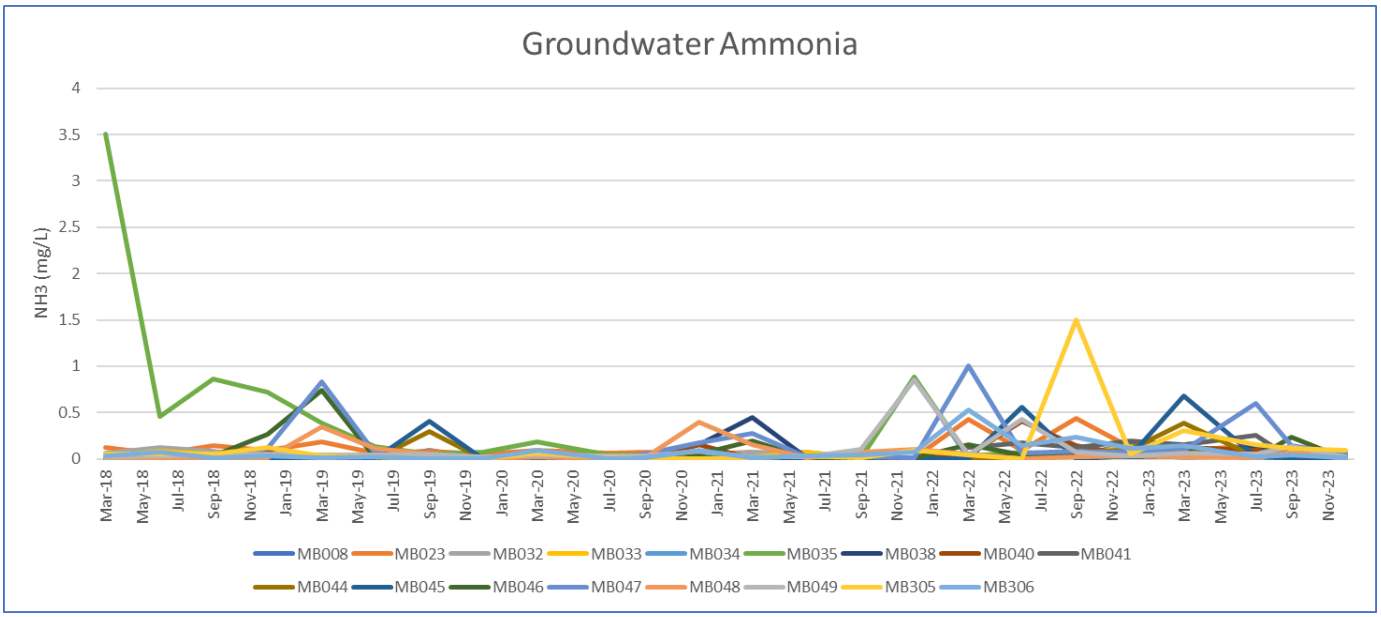
A GMP was prepared for the site by Douglas Partners in consultation with EPA and DPI Water and subsequently submitted to DP&E 19 October 2017.

As required by the GMP additional groundwater monitoring bores have been installed to the North of the site MB048 and MB049. Attempts to refurbish MB022 were not successful.

Currently awaiting clarification from Natural Resources Access Regulator on the requirements of a Ground Water Extraction License.

Results Analysis:

A total of two exceedances were recorded in 2023. The first exceedance was recorded in March for MB047 at 2.8mg/L and the second exceedance was recorded in July for MB032 at 1.5mg/L. MB047 was resampled on 20/4/2023 where the ammonia concentration decreased to 0.092 and MB032 was resampled on 15/08/2023 where the ammonia concentration decreased to 0.038mg/L. No ammonia exceedances above the license limit of 1mg/L were detected during the September and December 2023 monitoring. This quarterly monitoring will continue to occur in 2024. The cause of March and July exceedance was unknown as it might be due to sampling or analytical errors.



9.2.3. Leachate

Leachate EIS Predictions:

The leachate assessment and water balance model indicate that the proposal would:

- Provide a final landform which increases the proportion of rainfall which would run off the surface.
- Provide a final landform which would decrease the proportion of rainfall which would infiltrate into the waste.
- Overall, generate less leachate than the current site arrangement. Through the reduction in leachate generation and the improvement of the cap and final landform, the proposal would also reduce the potential to impact the environment through surface water and groundwater.

The existing leachate management system has the capacity to manage the volumes of leachate estimated to be generated in the modelled average rainfall and wet rainfall years through the use of emergency leachate containment in the double lined emergency leachate containment dam and Cell 5.3. These containment structures were designed for this purpose.

The leachate assessment addresses the SEARs and concludes that the proposal would meet the following objectives:

- No significant impacts on the community or environment.
- Prevention of groundwater pollution by leachate.

- Prevention of surface water pollution by leachate, including Mill Creek.
- Prevention of the degradation of local amenity.

Leachate Statutory Requirements:

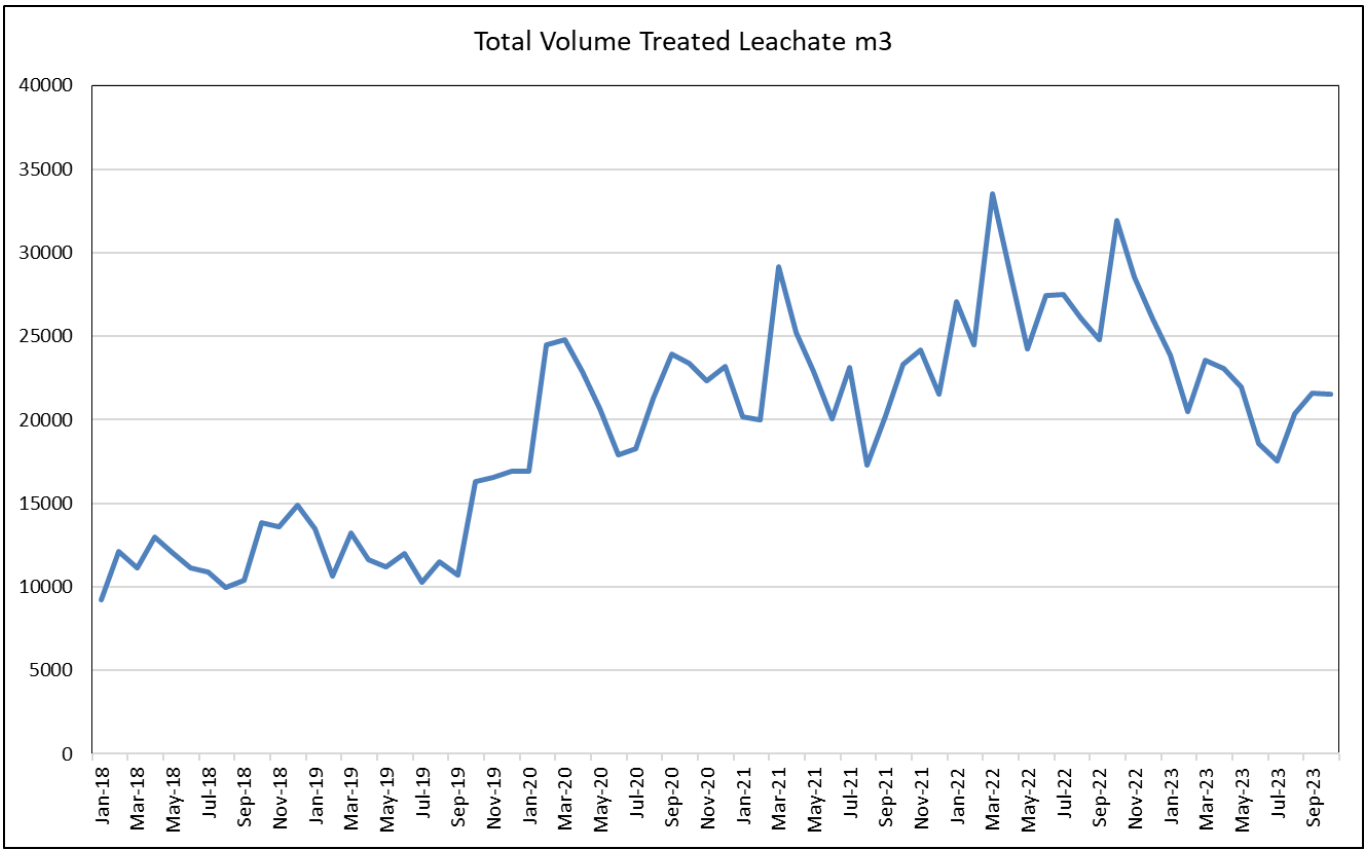
Leachate flow monitoring is required to be monitored continuously and reported quarterly, under EPL 5065 for each location which is listed below.

Leachate flow monitoring locations

EPL Identification No.	Bore Number
41	Leachate flow monitoring – LH2 leachate flow meter
42	Leachate flow monitoring – LH1 leachate flow meter
43	Leachate flow monitoring – Harrington's Quarry leachate flow meter

Leachate collected within the dams is transferred to LH1 where the leachate is sent through a liquid treatment facility which treats the liquid before it is discharged to sewer under a Trade Waste Agreement with Sydney Water.

Leachate volumes are monitored on a quarterly basis by an external contractor.



Results Analysis:

Leachate extraction has been reasonably stable over recent years, this is expected to lower with the improvement of the cap and final landform. Actual results are provided Appendix E.

For the year 2023, there was 835.5mm of rainfall on the landfill and therefore the treated leachate volume was 256,398m^3 for the year.

The leachate water balance model in EIS predicts an average volume of 247,060 m^3 and a wet volume of 307,563 m^3. The actual volume of leachate generated in 2023 wasn't significantly higher than the water balance model.

9.3. Noise

Note, preparation works for the construction of the GO facility commenced in January 2023.

EIS Noise Predictions:

Construction activities are predicted to comply with the 'Interim Construction Noise Guideline' (DECC 2009) construction noise management levels at all sensitive receivers both during standard and outside of standard recommended hours. The nearest sensitive receivers are over 300m from the proposal site. Due to the distance from the proposal site, construction vibration impacts are not anticipated at any sensitive receivers.

The noise levels, assuming all equipment to be operational at the landfill and GO Facility (a conservative assumption), are predicted to comply with all noise criteria. The road traffic noise levels from the proposal are also predicted to comply with the noise criteria at sensitive receivers along the traffic routes.

This assessment addresses the SEARs and concludes that the proposal would meet the following objectives:

- No significant impacts on the community or environment
- Prevent the degradation of local amenity
- Prevent noise pollution.

From EIS, Predicted operational noise levels

Noise measurements were conducted on 12 December 2023 by RWDI, with the following results:

Location	Minimum Recorded Level	Estimated Site Noise Contribution L_{Aeq}	Noise limit $L_{Aeq,15min}$	Compliance
R1	36	< 26	35	Yes
R2	32	< 22	35	Yes
R3	38	< 28	35	Yes
R6	37	< 27	37	Yes
R7	32	< 22	35	Yes
R8	42	< 32	35	Yes

Results Analysis:

The report concluded:

The Lucas Heights Resource Recovery Park is required to conduct annual compliance noise monitoring as outlined in Development Consent SSD 6835. This report details the annual monitoring that took place on 12 December 2023.

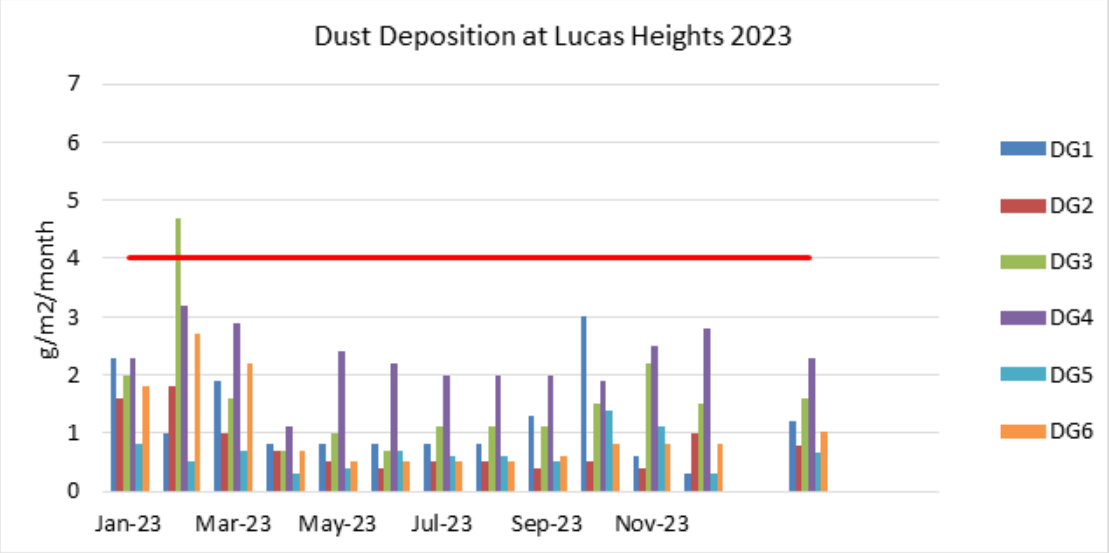
Noise contributions from the LHRRP at the surrounding residential receivers have been measured and assessed. The assessment found that all the relevant noise requirements of the Development Consent have been complied with.

9.4. Dust

Cleanaway conducts monthly dust deposition monitoring around the boundary of the site using dust deposition gauges which collect dust over approximately one month (i.e. 30 days ± 2days). The samples are analysed, and a one-month deposition rate is calculated.

NSW EPA assessment criteria allows a dust deposition rate of 4 g/m^2 month for total insoluble solids

Lucas Heights Resource Recovery Park Dust Gauge Locations



Results Analysis:

On average, dust gauge 4 records the highest dust deposition over the 12 month period. However there were no exceedances above the 4 g/m2/month EPA guideline for insoluble solids. Dust gauge 3 recorded an exceedance of 4.7 g/m2/month for the month of February. Cleanaway believes that this exceedance could be due to overhanging branches depositing debris into the sample bottle as the results from March to December were below the NSW EPA limit.

10. Waste Limits

Cleanaway has provided the updated waste volumes for 2023 below:

B6. The Applicant shall not receive more than:	**2023**
(a) 970,000 tonnes of general solid waste (putrescible and non-putrescible) and asbestos waste per calendar year on site for landfill disposal;	956,740
(b). 10,000 tonnes of recyclable general solid waste (non-putrescible) and batteries per calendar year on site at the Resource Recovery Centre and waste collection point;	422
(c) 100,000 tonnes of garden and wood waste and 2,000 tonnes of manure per calendar year at the GO Facility;	42,935

All results in Tonnes.

11. Improvement Programs

Several improvements to the environmental management of the LHRRP have been implemented during this reporting period. These improvements were implemented as a result of findings by Cleanaway's ongoing inspections and monitoring as well as findings identified by regulatory inspections.

Examples of these improvements include:

- Installation of dual gas and leachate trench/s in Area C and F.
- Installation of final cap in Area G.
- Additional gas collection wells in Area G.
- Approval of Consent Mod Number 2.
- Completed the wheel wash upgrade.

Improvements that will be implemented during the next reporting period include:

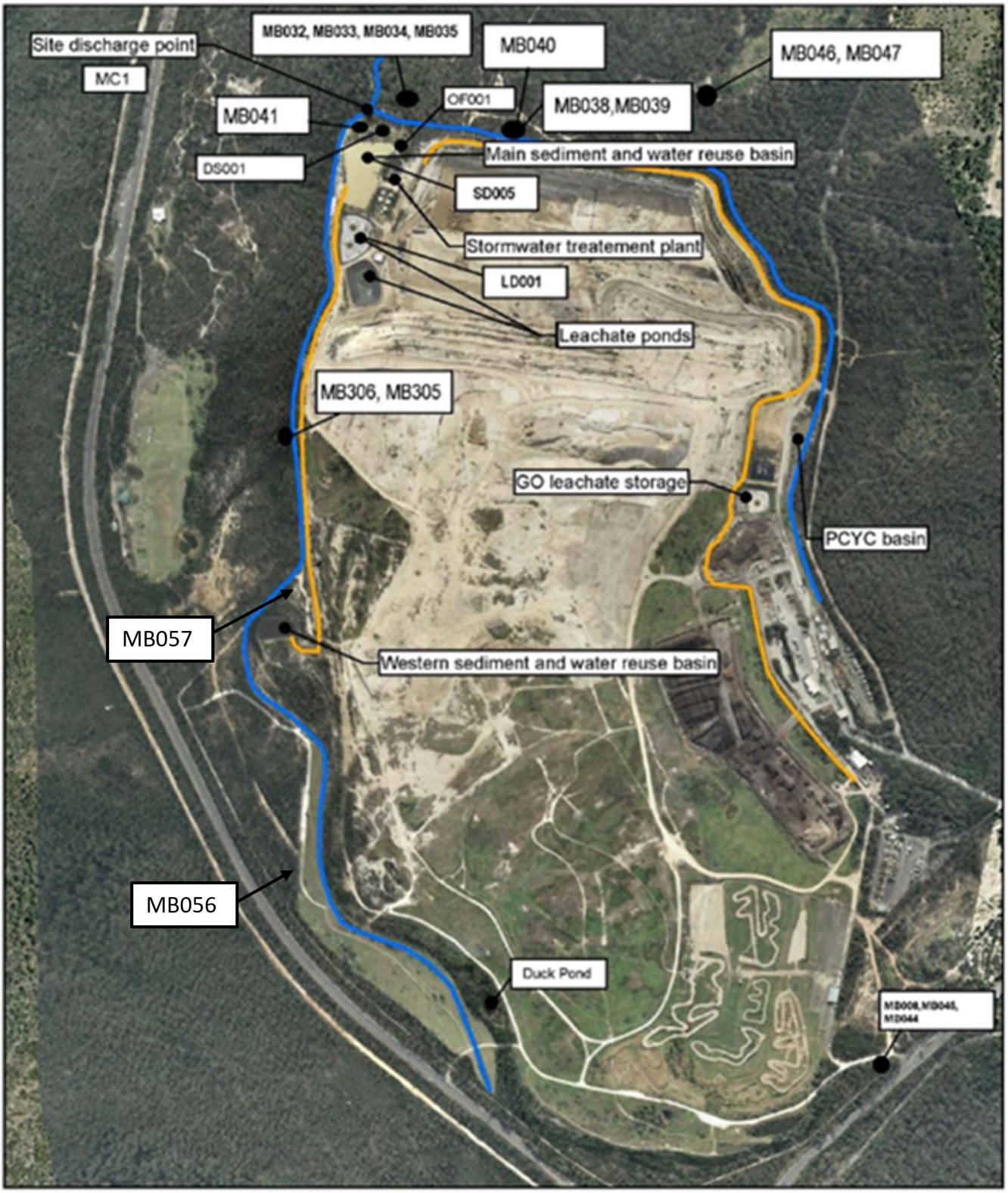
- More final cap will be installed in Area C and F.
- Completion of the gas collection system in Area C and F.
- Commencement of the excavation Stage 2 of the new Garden Organics (GO) Facility.
- Commencement of Mill Creek diversion and associated works.
- Commencement of North wall excavation stage 2C
- Commencement of liner installation of the North wall.

There is no action proposed by the previous Annual Review.

12. Conclusions

Based on the results of environmental monitoring undertaken at LHRRP, the overall environmental performance in this reporting period can be demonstrated to be well managed. The number of odour complaints is lowest on record. There were a number of significant projects, such as the installation of final cap and gas infrastructure in area G, which assisted in maintaining environmental and operation compliance. Furthermore, with the continuation of remediation projects, such as the ongoing litter picking and increasing the number of gas extraction wells, this will continue to improve our environmental performance.

APPENDIX A – Monitoring Points



APPENDIX B – Subsurface Gas

	Mar-19	Jun-19	Sep-19	Dec-19	Mar-20	Jun-20	Sep-20	Dec-20	Mar-21	Jun-21	Sep-21	Dec-21	Mar-22	Jun-22	Sep-22	Dec-22	Mar-23	Jun-23	Sep-23	Dec-23
MB036	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	<0.1	<0.1	<0.1	<0.1	0	0
MB037	0.1	0.1	0.1	0.1	0.4	0.1	0.1	0.1	0.1	0.1	0.5	0.1	10.7	6.6	11.9	<0.1	0.6	<0.1	0	0
MB036-1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	<0.1	<0.1	<0.1	0	0
MB037-1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.6	0.1	0.2	<0.1	<0.1	<0.1	0	0
MB042	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.2	<0.1	<0.1	<0.1	0.1	0	0
MB043	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	<0.1	<0.1	<0.1	0	0	0
MB046	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	<0.1	<0.1	<0.1	<0.1	0	0
MB047	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	<0.1	<0.1	<0.1	<0.1	0	0
MB048	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	<0.1	<0.1	<0.1	0	0
MB049	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.1	0.1	0.1	0.1	0.8	0.1	0.1	<0.1	<0.1	<0.1	0	0

APPENDIX C – Surface Gas Monitoring Data

Date	Average	Min	Max
3/03/11	130.0	0.0	4225.0
21/04/11	41.0	0.0	2240.0
4/08/11	7.3	0.0	662.0
8/11/11	32.7	0.0	589.0
6/03/12	17.2	0.0	333.0
26/07/12	29.3	0.0	359.0
13/11/12	18.1	0.0	130.0
20/12/12	18.6	0.0	370.0
20/03/13	18.9	0.0	177.0
18/06/13	24.4	2.0	158.0
16/09/13	23.9	1.8	173.8
8/01/14	14.7	0.1	90.1
27/03/14	19.4	0.2	98.1
3/07/14	17.7	0.2	79.6
1/10/14	19.1	1.1	98.2
17/12/14	18.1	1.0	84.2
20/03/15	17.9	1.1	220.0
11/06/15	17.1	1.4	431.2
2/11/15	10.9	1.0	225.8
11/03/16	19.3	1.6	231
24/06/16	20.4	1.6	221
7/09/16	27.4	2.3	264
21/12/16	31.6	2.1	294
21/04/17	30.4	2.1	251
16/08/17	33.5	3.2	261
12/09/17	31.1	5	454.7
20/11/17	8.38	1.4	81.4
19/01/18	22.42	1.5	294
30/04/18	16.7	1.3	241.3
5/07/18	8.38	1.4	81.4
6/12/18	9.37	0.4	257.5
18/04/19	11.9	1.6	446.4
1/08/19	11.4	1.5	377.7

31/10/19	129.2	1.6	135590.7
15/11/19	145.8	1.9	9409.9
16/01/20	10.1	0.4	181.4
20/04/20	12.9	12.9	401.8
14/07/20	25.4	1.5	491.4
21/10/20	11.9	1.6	421
22/01/21	11.4	1.5	309.2
2/04/2021	11.81	1.6	413.2
27/07/2021	11.47	1.5	298.3
21/10/2021	16	1.6	497.7
10/01/2022	11.78	1.6	362.1
18/04/2022	11.86	1.6	421
4/07/2022	12.86	1.9	301.2
29/11/2022	10.11	1.1	603
29/3/2023	20.1	1.2	13000
31/5/2023	17.6	1	8400
15/9/2023	25.7	1	113000
22/12/2023	43.6	2.2	489

APPENDIX D – Groundwater Ammonia Monitoring Data

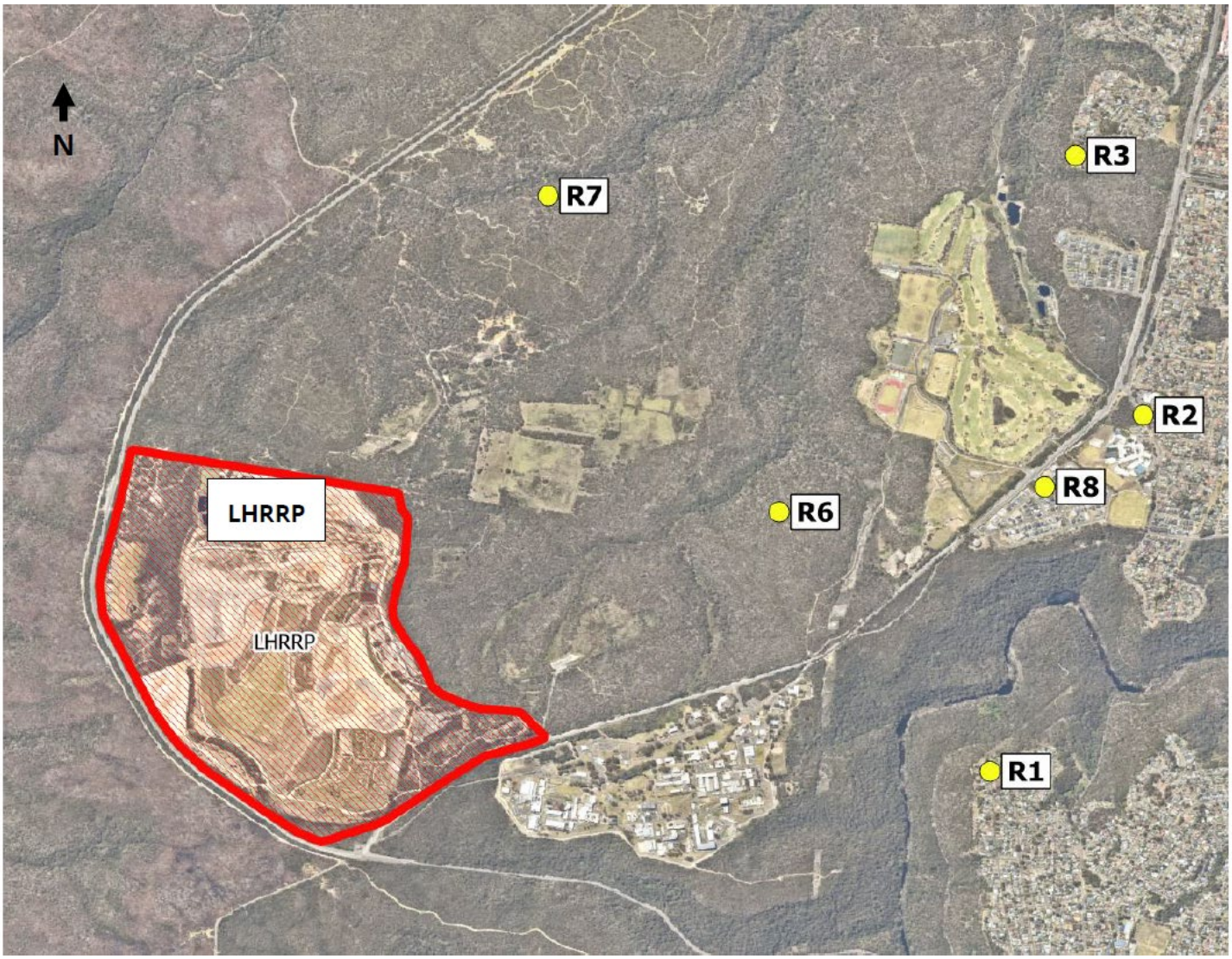
	Mar-18	Jun-18	Sep-18	Dec-18	Mar-19	Jun-19	Sep-19	Dec-19	Mar-20	Jul-20	Sep-20	Dec-20	Mar-21	Jun-21	Sep-21	Dec-21	Mar-22	Jun-22	Sep-22	Dec-22	Mar-23	Jul-23	Sep-23	Dec-23
MB008	<0.005	0.016	<0.005	<0.005	<0.005	<0.005	0.097	<0.050	0.02	<0.005	<0.005	0.007	0.03	<0.005	0.01	0.017	0.005	0.021	0.024	0.17	0.096	0.058	0.019	<0.005
MB023	0.12	0.053	0.14	0.09	0.18	0.066	0.088	0.048	0.098	0.066	0.078	0.051	0.074	<0.005	0.01	0.017	0.43	0.094	0.44	0.12	0.095	0.14	0.093	0.069
MB032	0.066	0.12	0.085	0.024	0.034	0.027	0.008	0.011	0.034	0.039	0.02	0.022	0.072	0.073	0.016	0.094	0.016	0.035	0.071	0.058	0.011	0.038	0.075	0.017
MB033	0.022	0.087	0.051	0.011	<0.01	0.005	<0.005	<0.005	0.083	<0.005	0.014	0.046	0.024	0.073	0.016	0.094	<0.005	0.04	0.054	0.13	0.067	0.062	0.047	0.006
MB034	0.008	0.047	0.012	<0.005	0.007	<0.005	<0.005	<0.050	0.025	<0.005	0.014	0.046	0.015	<0.005	0.011	0.88	0.007	0.005	0.06	0.065	0.02	0.077	0.052	0.01
MB035	3.5	0.46	0.86	0.72	0.39	0.13	0.048	0.069	0.18	0.039	0.039	0.048	0.024	<0.005	0.011	0.88	0.028	0.076	0.037	0.048	0.049	0.12	0.075	0.031
MB038	0.017	0.025	0.026	0.009	0.013	0.011	<0.005	<0.005	<0.005	<0.005	<0.005	0.15	0.45	0.013	<0.005	<0.005	0.037	0.022	0.06	0.022	0.029	0.14	0.097	<0.005
MB040	0.016	0.02	0.039	0.1	0.01	0.012	0.048	<0.005	0.016	0.006	0.012	0.15	0.005	0.013	<0.005	<0.005	0.04	0.41	0.14	0.042	0.12	0.097	0.056	0.013
MB041															0.044		0.12	0.17	0.12	0.19	0.15	0.26	nt	nt
MB044	<0.005	0.019	0.032	<0.005	0.006	0.006	0.3	<0.005	0.012	<0.005	0.006	<0.005	0.016	0.013	<0.005	<0.005	<0.005	0.022	0.063	0.1	0.39	0.021	0.015	0.005
MB045	<0.005	0.016	0.039	<0.005	<0.005	<0.005	0.41	<0.005	0.013	<0.005	<0.005	0.013	0.005	0.011	0.008	<0.005	<0.005	0.56	0.007	0.028	0.68	0.019	0.011	0.012
MB046	0.015	0.02	0.032	0.27	0.74	0.014	0.021	<0.005	0.076	<0.005	0.021	0.056	0.19	0.011	0.009	0.008	0.15	0.041	0.051	0.036	0.1	0.016	0.23	<0.005
MB047	0.04	0.012	0.031	0.11	0.83	0.066	<0.005	<0.005	0.019	<0.01	0.05	0.17	0.28	0.019	0.018	0.011	1	0.064	0.083	0.078	0.092	0.6	0.14	0.055
MB048	<0.005	0.012	0.016	0.014	0.35	0.11	0.048	<0.005	0.024	0.007	0.009	0.4	0.15	0.014	0.076	0.1	0.048	0.005	0.025	0.032	0.023	0.01	0.072	<0.005
MB049	0.02	0.029	0.045	0.056	0.043	0.045	0.057	0.025	0.043	0.031	0.036	0.082	0.019	0.023	0.1	0.85	0.04	0.43	0.075	0.035	0.061	0.053	0.13	0.027
MB305	0.054	0.048	0.049	0.12	0.032	0.025	0.005	0.007	0.067	0.008	0.014	<0.005	0.011	0.031	0.016	0.09	0.042	0.007	1.5	0.052	0.31	0.15	0.11	0.097
MB306	0.037	0.068	0.013	0.033	0.012	0.024	<0.005	<0.005	0.092	<0.005	0.016	0.097	0.008	0.03	0.043	0.07	0.53	0.14	0.23	0.11	0.14	0.022	0.046	0.013

APPENDIX E – Leachate Treated at Lucas Heights 1 Treatment Plant

Date	Total Volume Treated Leachate m3	
Jan-19	13446	
Feb-19	10653	
Mar-19	13203	
Apr-19	11599	
May-19	11210	
Jun-19	11961	
Jul-19	10290	
Aug-19	11519	
Sep-19	10723	
Oct-19	16288	
Nov-19	16526	
Dec-19	16908	**154326**
Jan-20	16932	
Feb-20	24461	
Mar-20	24773	
Apr-20	22886	
May-20	20641	
Jun-20	17927	
Jul-20	18246	
Aug-20	21272	
Sep-20	23908	
Oct-20	23345	
Nov-20	22330	
Dec-20	23175	**259896**
Jan-21	20205	
Feb-21	20005	
Mar-21	29175	
Apr-21	25212	
May-21	22853	
Jun-21	20042	
Jul-21	23101	
Aug-21	17310	
Sep-21	20223	
Oct-21	23330	
Nov-21	24160	
Dec-21	21521	**267137**

Jan-22	27054	
Feb-22	24490	
Mar-22	33551	
Apr-22	28822	
May-22	24232	
Jun-22	27434	
Jul-22	27504	
Aug-22	26093	
Sep-22	24768	
Oct-22	31911	
Nov-22	28557	
Dec-22	26031	**330447**
Jan-23	23875	
Feb-23	20491	
Mar-23	23542	
Apr-23	23044	
May-23	21957	
Jun-23	18554	
Jul-23	17526	
Aug-23	20354	
Sep-23	21619	
Oct-23	21511	
Nov-23	21176	
Dec-23	22749	**256398**

APPENDIX F – Noise Monitoring Locations



APPENDIX G - Leachate Calibration Report

133 Castlereagh Street, Level 15
Sydney, New South Wales 2000
Australia
ghd.com

Your ref:
Our ref: 12625448

09 January 2024

LC Chaing
Cleanaway Pty Ltd
Landfill Manager
New Illawarra Road
Lucas Heights, NSW

Dear LC,

Lucas Heights Leachate Waste Balance Review - 2023

1. Introduction

GHD has undertaken a calibration of the leachate model which was included in the EIS for the Lucas Heights 2 Landfill expansion project by comparing the leachate model with measured rainfall and site monitoring data from January 2022 to October 2023.

The purpose of the calibration is to assess the quality of the leachate model in providing prediction of future capacity requirements for leachate storage and treatment.

This letter outlines the calibration method and results.

2. Background

General

As part of the development of the EIS for the expansion of Lucas Heights 2 Landfill, GHD prepared a leachate water balance for to assess the capacity of the leachate management system to manage the volumes of leachate expected to be generated for the proposed site arrangement. The leachate water balance model was based on infiltration predictions from HELP modelling and historical average generation volumes from other leachate sources.

GHD's leachate assessment included a recommendation to undertake periodic review of the leachate water balance model throughout the development of the site. Consent (No. SSD 6835, dated 23 January 2017) states:

> *C28. The Applicant shall routinely monitor leachate volumes from all sources and re-calibrate the leachate model included in the EIS, to ensure adequate storage, treatment and disposal capacity is maintained at all times. The Applicant shall report the results of on-going monitoring and model calibration every year in the Annual Review required under Condition D7.*
>
> *C29. The Applicant shall implement any recommended measures identified by leachate model calibrations to maintain adequate storage, treatment and disposal capacity for the LHRRP at all times.*

The volume of leachate generated at a landfill is typically proportional to the surface area of the landfill as a percentage of rainfall (via infiltration). Since the expansion project was approved, landfilling at the site has extended over the remaining unfilled area in the northern excavation void, with Cell 5.3 C being approved for landfilling under the EPL (No. 5065) on 17 July 2017. In addition, additional landfilling and subsequent capping works have progressed across the southern parts of the site.

Previous model calibrations

A calibration was undertaken based on 2017/18 monitoring data. That assessment concluded that the calibration period was significantly drier than the 50% AEP (average) rainfall year and that the results of the calibration were insufficient to warrant recommending any changes to the site's existing practices or leachate management system. It was recommended that the leachate model be recalibrated following a period of typical conditions once site moisture levels have equilibrated.

A calibration undertaken based on 2020 monitoring data, which reflected wet conditions, with rainfall being close to the 10% AEP conditions modelled for the EIS leachate assessment. Again, the calibration indicated that the leachate water balance models are providing a fair prediction of the volumes of leachate being generated from various sources and that no changes were required to be made to the site's leachate management practices or systems.

3. Current leachate management system

A flow diagram is provided in Attachment 1 to illustrate GHD's current understanding of the interaction of the various generation, storage, treatment and disposal aspects.

In summary the system operates as follows:

– Leachate collected from the leachate risers at Lucas Heights 2 Landfill (LH2), along with leachate collected by two leachate ring mains and leachate from Harrington's Quarry, is initially stored in the 8 ML main leachate pond at LH2 before being pumped to the leachate treatment plant pond at Lucas Heights 1 Landfill (LH1). If required, the emergency leachate pond (10 ML) at LH2 is used to manage any excess leachate volume;
– Leachate generated at LH1 is stored in one of three ponds at LH1: the leachate storage irrigation dam; the emergency storage dam; and the leachate treatment plant holding pond. The total operational storage volume at LH1 is 9.5 ML;
– Leachate is removed from the LH1 treatment plant holding pond and treated prior to discharge to sewer; and
– Water removed from the LH2 groundwater collection system and some contaminated surface waters are stored in leachate holding tanks (5 x 100 m^3) at LH2 prior to being discharged directly to sewer.

4. Monitoring data

Cleanaway provided monthly monitoring data for January 2022 to October 2023.

A copy of the provided data is contained in Attachment 2. Key data has been extracted and included on the flow diagram contained in Attachment 1.

5. Leachate water balance calibration

5.1 General

A calibration period of 12 months of 2022 and 10 months of 2023 has been selected.

The EIS leachate water balance model was updated to reflect:

– The climatic conditions experienced during the calibration period;
– The actual site arrangement during the calibration period; and
– The estimated rainfall infiltration volumes through the various cover and cap profiles, based on the infiltration rates developed as part of the EIS leachate assessment.

This updated model is referred to as the calibration model, with results summarised in Section 5.3.

5.2 Calibration data

5.2.1 Climate

Climate data for the calibration period was sourced for BOM weather station 66078 Lucas Heights (ANSTO) from Queensland Government Department of Science, Information Technology and Innovation (http://www.longpaddock.qld.gov.au/silo).

Table 1 Climatic conditions

	Rainfall (mm)	Evaporation (mm)
Average conditions 50% AEP (1)	1,015	1,319
Wet conditions 10% AEP (1)	1,315	1,469
Calibration period	1,266	1,488

It is noted that the rainfall for the calibration period (from SILO):

– For calendar year 2022 was the wettest year on record [1], with 2,419 mm of rain.
– For the November 2022 – October 203 period, was drier than average rainfall conditions [1], with only 629 mm of rain.

5.2.2 Site arrangement

Site aerial photographs for the calibration period were reviewed. Over the calibration period:

– Active landfilling was being undertaken over Area G for most of 2022, with operations moving to Area C in 2023.
– Installation of the landfill cap over Areas A and B were being undertaken throughout 2022 and revegetation completed by early 2023.

To capture this change in operations, two site arrangement scenarios have been developed and applied:

– January – December 2022: Active landfilling within Area G with the commencement of cap stripping works in Area C.
– January – October 203: Completion of filling in Area G and progression of active landfilling in Area C, with cap fully established in Area A and B.

The cap and cover areas applied in these periods have been illustrated in Attachment 3.

5.2.3 Rainfall infiltration

Rainfall infiltration rates for the various site cover and cap profiles were developed as part of the EIS Leachate Assessment using Hydraulic Evaluation of Landfill Performance (HELP). Infiltration rates for average (50% AEP) and wet (10% AEP) rainfall conditions were developed.

[1] determined as part of the EIS leachate assessment through analysis of 55 years of historical data

The rainfall infiltration used in the calibration is applied with the same temporal patterns as the HELP model results.

5.3 Results and discussion

The updated EIS leachate water balance model is contained in Attachment 4.

January – December 2022

Total annual volumes estimated by the calibration model and comparisons to the provided monitoring data for calendar year 2022 is summarised below and in Table 2.

Table 2 Calibration model results and comparison to monitoring data - 2022 compared to 90% AEP wet year

	Calibration model [2] results (m^3)	2022 monitoring data (m^3)	Variance (as a % of monitoring data)
	(A_{wet})	**(B)**	**=(A_{wet}) / (B)**
LH2 leachate[3]	263,885	183,618	144%
Harrington's Quarry	7,300	12,279	59%
LH1 leachate	121,180	176,224	69%
Net leachate generation	417,729	372,121	112%
Cell 5.3 excavation catchment generation [4] + groundwater collection system	136,195	88,787	153%

The 2022 calibration model:

– Overestimates leachate generation from LH2 by infiltration. This may be a reflection of the extreme wet conditions which are not well reflected by the HELP modelling which was based on 90% AEP conditions.

– Underestimates the contribution from Harrington's quarry, but overall this is a small portion of overall leachate to be managed (~4% of the treated leachate)

– Underestimates the volume of leachate generated at LH1. Almost half of the overall leachate treated in 2022 was generated at LH1, and this proportion could be expected to rise with similar climatic conditions as more cap is placed at LH2. This may reflect the quality of the cap at LH1, which may also have areas of high infiltration where surface water can pond.

– Overestimates the net volume of leachate generated, indicating that the generation modelling is conservative even in these extreme conditions.

– Groundwater and stormwater contributions were significantly overestimated. This volume is highly dependent on the catchment area, which may be overestimated in the model and may vary over time. Generally, this water is discharged directly to sewer so does not impact the leachate treatment plant capacity.

– The leachate treatment plant average treatment rate for 2022 was recorded to be 905.3 kL/day, with a monthly peak of target treatment rate of 1090 kL/day. This is higher than the assumed 900 kL/day and this provided additional disposal capacity during key periods.

– Shows that significant volumes of leachate would be temporarily stored within the lined landfill cell, however this indicative stored volume at the end of the year reduces to about one-third when the additional disposal capacity is considered.

[2] The calibration model is the EIS leachate water balance model updated for the climatic conditions and site arrangement experienced during the calibration period. It utilises the wet (90% AEP) infiltration rates which were generated as part of the EIS leachate assessment using HELP.
[3] Calibration volume = rainfall infiltration, Monitoring data = LH2 to LH1 transfer volume – Harrington's quarry
[4] This assumes any rainfall exceeding evaporation (ie surface water build-up over the month) is treated as leachate. This is consistent with the assumptions made in the EIS leachate assessment.

During 2022, Cleanaway did not need to store any excess leachate within the northern lined cells, indicating that, even in extreme wet conditions, there is sufficient leachate storage, treatment, and disposal capacity in the system.

November 2022 – October 2023

Total annual volumes estimated by the calibration model and comparisons to the provided monitoring data for the period from November 2022 to October 2023 and is summarised below and in Table 3.

Table 3 ***Calibration model results and comparison to monitoring data – Nov 2022 – Oct 2023 compared to 50% AEP average year***

	Calibration model [5] results (m^3)	2022/2023 monitoring data (m^3)	Variance (as a % of monitoring data)
	(A_{av})	**(B)**	**=(A_{av}) / (B)**
LH2 leachate[6]	57,996	146,126	40%
Harrington's Quarry	5,475	7,889	69%
LH1 leachate	98,550	99,399	99%
Net leachate generation	157,492	253,414	62%
Cell 5.3 excavation catchment generation [7] + groundwater collection system	36,226	49,143	74%

The 2022/23 calibration model:

– Underestimated the leachate generation from LH2 by infiltration. This is likely to be as a result of the extreme wet conditions experienced in the 12 months prior.
– Underestimates the contribution from Harrington's quarry, but overall this is a small portion of overall leachate to be managed (~3% of the treated leachate).
– Provided a fair representation of leachate generated at LH1.
– Underestimates the net volume of leachate generated. This is likely related to the wet conditions of 2022.
– Underestimated the contribution of groundwater. Again, it is reasonable to expect some ongoing delayed release of groundwater after an extended or extreme wet period. Generally, this water is discharged directly to sewer so does not impact the leachate treatment plant capacity.

It is expected that leachate generation across the site will fall into the future, as the vegetation on the recently installed final cap over Area A and Area B continues to establish, and is installed over Area G (commenced December 2023).

6. Conclusions and recommendations

The EIS leachate assessment leachate water balance models were revised to reflect the site arrangement and climatic conditions for January 2022 to October 2023. The period experienced extreme weather conditions, with 2022 being the wettest on record and 2023 being one of the driest. The calibration models indicate that, in these extreme conditions, individual components of the model do not present a fair representation of leachate generation across the various sources, and these calibration models:

[5] The calibration model is the EIS leachate water balance model updated for the climatic conditions and site arrangement experienced during the calibration period. It utilises the average (50% AEP) or wet (90% AEP) infiltration rates which were generated as part of the EIS leachate assessment using HELP.
[6] Calibration volume = rainfall infiltration, Monitoring data = LH2 to LH1 transfer volume – Harrington's quarry
[7] This assumes any rainfall exceeding evaporation (ie surface water build-up over the month) is treated as leachate. This is consistent with the assumptions made in the EIS leachate assessment.

– Overestimate leachate generation in extreme wet conditions, and
– Underestimate leachate generation in extreme dry conditions following an extreme wet period.

As such, the models are conservative for future predictions of leachate storage and disposal requirements.

The results of the calibration do not indicate that any changes are required to the site's existing practices or leachate management system. Progressive closure of the site will ensure ongoing reduction in leachate volumes.

The leachate model should be reviewed at a frequency of at least every five years in accordance with consent Mod 2. Additional calibration may be required if the on-going monitoring data suggests more leachate is being generated than can be routinely managed at the site (via storage, treatment and disposal). In particular, the performance of the cap at LH1 may need to be reviewed.

7. Limitations

This report: has been prepared by GHD for Cleanaway Pty Ltd and may only be used and relied on by Client for the purpose agreed between GHD and Cleanaway Pty Ltd as set out in Section 1 of this report.

GHD otherwise disclaims responsibility to any person other than Client arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Cleanaway Pty Ltd and others who provided information to GHD, which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

Sincerely

Adrian Roberts
Team Leader, Design Element - Waste Management

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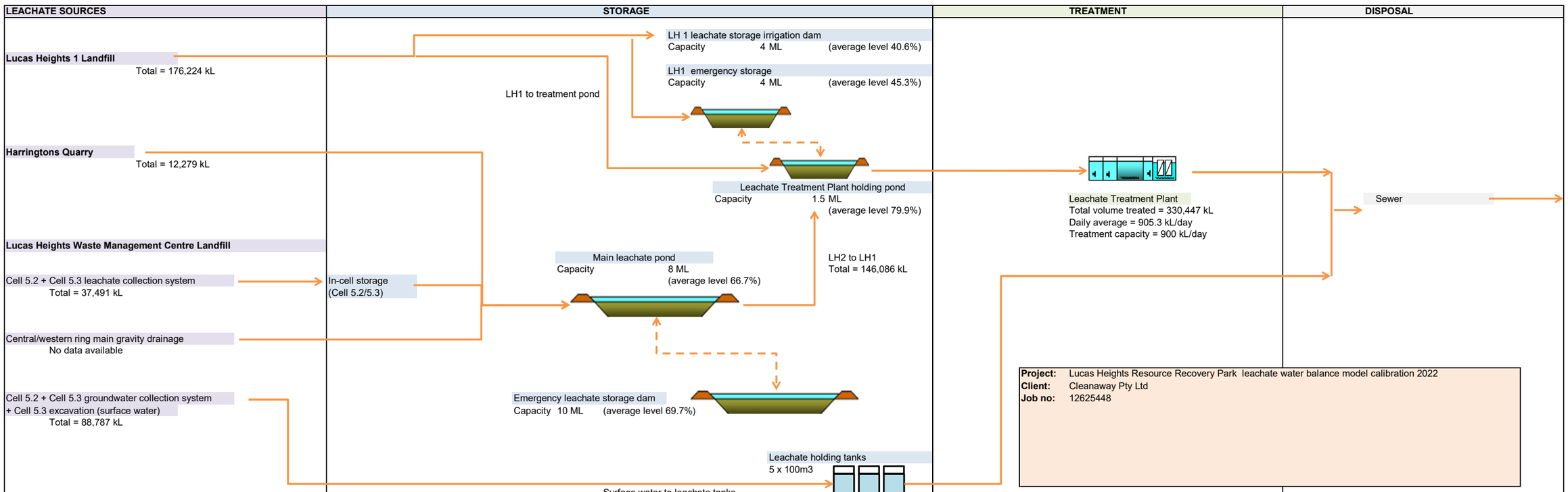
Attachment 1

Leachate flow diagram

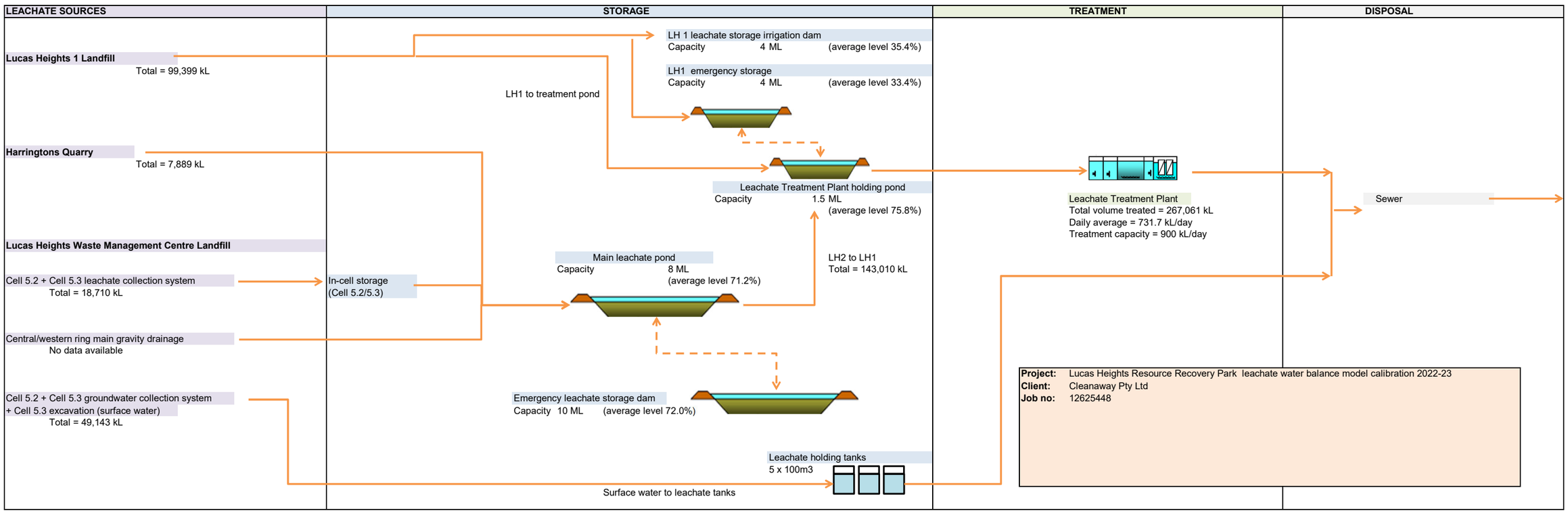
Leachate Conceptual Model

January - December 2022



Leachate Conceptual Model

November 2022 - October 2023



Attachment 2

Monitoring data

SUEZ Recycling and Recovery Pty Ltd

Leachate Inventory and Status Report
LH1 CLOSED LANDFILL

JPG Engineering

Year Avg Rainfall - 1015mm
BOM Station No. (Ansto): 66078

Lucas Heights Resource Recovery Park

Month	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23
Date	31/01/22	28/02/22	31/03/22	01/05/22	31/05/22	01/07/22	01/08/22	01/09/22	30/09/22	31/10/22	30/11/22	30/12/22	31/01/23	28/02/23	31/03/23	01/05/23	01/06/23	30/06/23	31/07/23	31/08/23	30/09/23	31/10/23
No of Days	31	28	31	31	30	31	31	31	29	31	30	30	32	28	31	31	31	29	31	31	30	31
Monthly Rainfall (mm)	185	244	567	220	122	10	648	26	86	205	53	30	128	97	59	95	21	10	11	59	39	28
Year Rain to Date (mm)	185	429	996	1,216	1,338	1,348	1,996	2,022	2,108	2,313	2,366	2,397	128	225	284	378	399	409	419	478	517	546
LUCAS HEIGHTS 1																						
LH1 Sump Totalised Flow (m^3)	1,242,747	1,252,460	1,267,922	1,283,254	1,300,026	1,313,769	1,327,656	1,341,511	1,353,097	1,366,721	1,378,797	1,389,022	1,399,406	1,407,874	1,416,718	1,424,905	1,432,686	1,439,875	1,446,697	1,453,350	1,459,486	1,466,485
LH1 Sump Total Leachate Transferred (m^3)	9,046	9,713	15,462	15,332	17,381	13,743	13,887	13,855	11,586	13,624	12,076	10,225	10,384	8,468	8,844	8,187	7,781	7,189	6,822	6,653	6,136	6,351
LH1 Leachate Pumped to Irrigation and Emergency Dams	733	934	5,581	6,982	-	-	5,140	-	15	906	1	2	3	2	1	274	-	-	-	-	-	-
LH1 Holding Dam Level (%)	74	83	81	85	85	81	93	82	79	70	73	74	75	86	71	72	78	81	75	72	78	74
LH1 Leachate Generation (m^3/day)	315	380	679	720	579	443	614	447	400	469	403	341	325	303	285	273	251	248	220	215	205	205
Aim LTP Treatment Rate for the Period (m^3/day)	885	880	1,090	940	810	890	900	865	860	1,040	960	870	750	745	770	760	720	650	570	660	725	700
LTP Raw Leachate Blend Rate (%)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	4	4	4
LTP Feed Totalised Flow (m^3)	3,483,508	3,507,998	3,541,549	3,570,371	3,594,603	3,622,037	3,649,541	3,675,634	3,700,402	3,732,313	3,760,870	3,786,901	3,810,776	3,831,267	3,854,809	3,877,853	3,899,810	3,918,364	3,935,890	3,956,244	3,977,863	3,999,374
LTP Total Volume Treated for the period (m^3)	27,054	24,490	33,551	28,822	24,232	27,434	27,504	26,093	24,768	31,911	28,557	26,031	23,875	20,491	23,542	23,044	21,957	18,554	17,526	20,354	21,619	21,511
LTP Average Daily Treatment Volume (m^3/day)	873	875	1,082	930	808	885	887	842	854	1,029	952	868	746	732	759	743	708	640	565	657	721	694
LTP Availability (calculated) %	99	99	99	99	100	99	99	97	99	99	99	100	99	98	99	98	98	98	99	99	99	99
LH1 Irrigation Dam Volume (m^3)	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000
LH1 Irrigation Dam Level (%)	33	57	96	98	72	42	20	24	14	12	11	8	13	16	16	20	17	31	78	79	76	60
LH1 Irrigation Dam Available Volume (m^3)	2,680	1,720	160	80	1,120	2,320	3,200	3,040	3,440	3,520	3,560	3,680	3,480	3,360	3,360	3,200	3,320	2,760	880	840	960	1,600
LH1 Emergency Dam Volume (m^3)	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000
LH1 Emergency Dam Level (%)	15	55	98	98	60	90	70	13	12	15	10	8	13	15	15	15	15	15	80	80	75	60
LH1 Emergency Dam Available Volume (m^3)	3,400	1,800	80	80	1,600	400	1,200	3,480	3,520	3,400	3,600	3,680	3,480	3,400	3,400	3,400	3,400	3,400	800	800	1,000	1,600

SUEZ Recycling and Recovery Pty Ltd

Leachate Inventory and Status Report
LH2 OPERATING LANDFILL

JPG Engineering

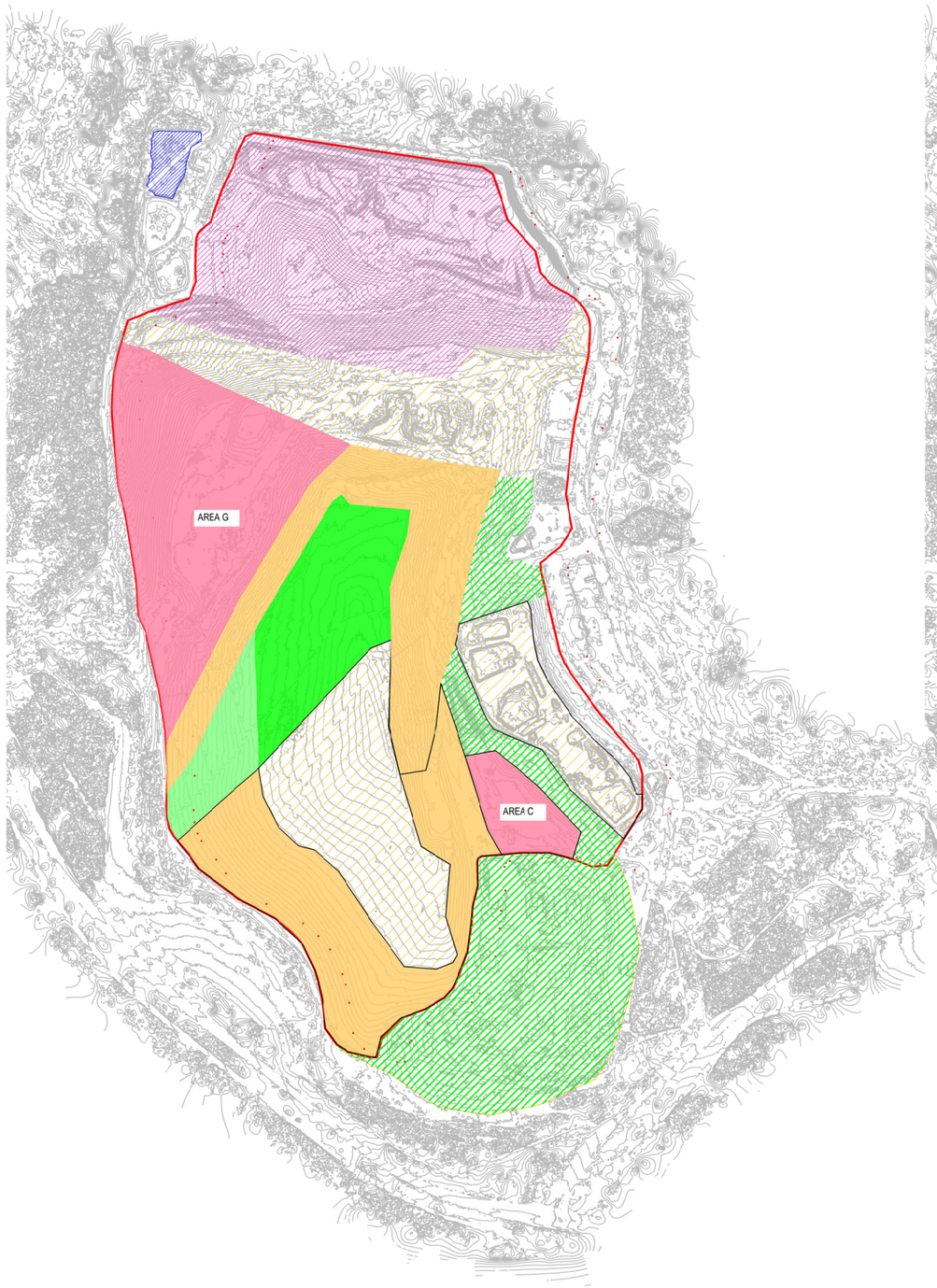
Year Avge Rainfall - 1015mm
BOM Station No. (Ansto): 66078

Lucas Heights Resource Recovery Park

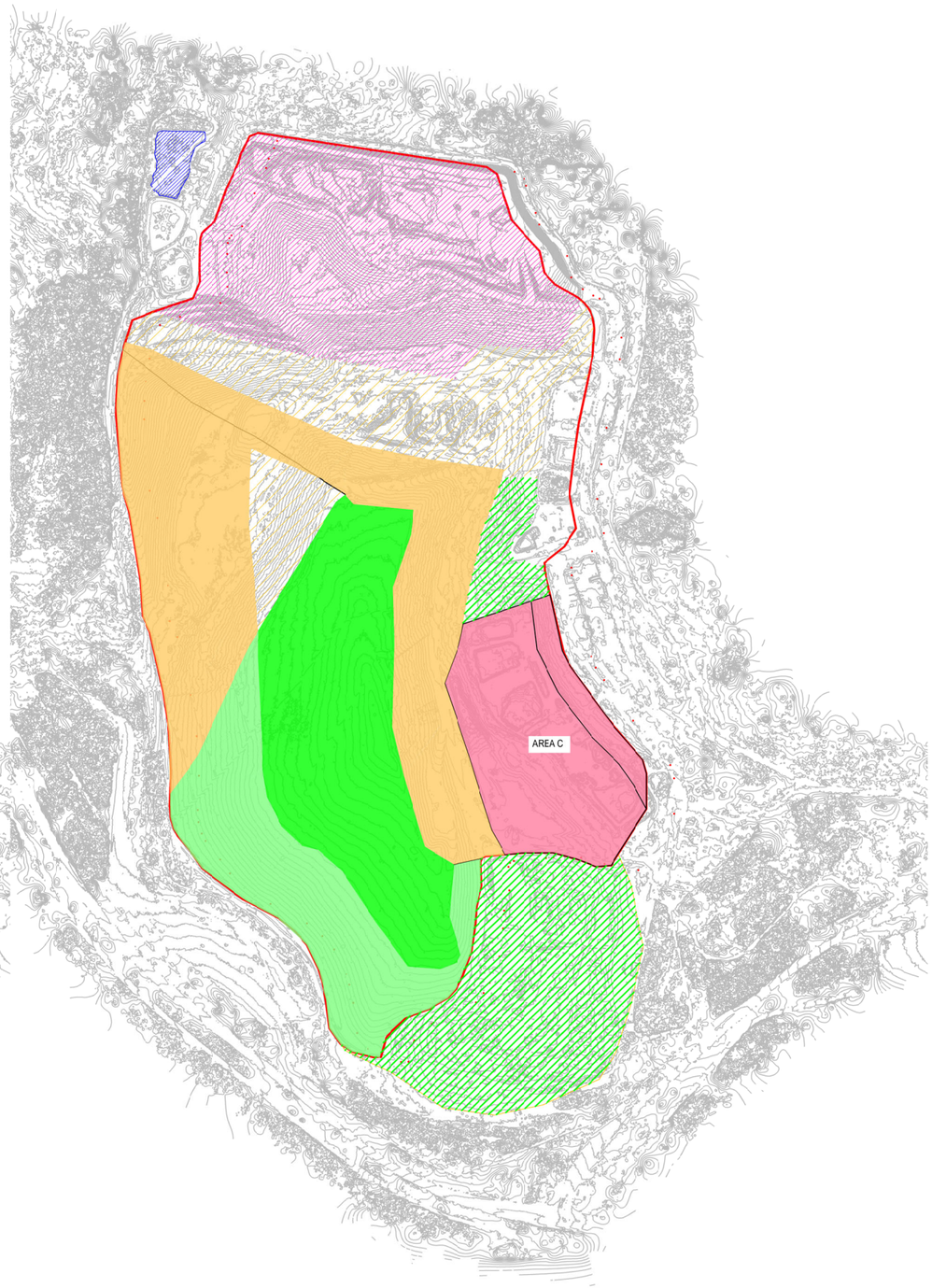
Month	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23
Date	31/01/22	28/02/22	31/03/22	01/05/22	31/05/22	01/07/22	01/08/22	01/09/22	30/09/22	31/10/22	30/11/22	30/12/22	31/01/23	28/02/23	31/03/23	01/05/23	01/06/23	30/06/23	31/07/23	31/08/23	30/09/23	31/10/23
No of Days	31	28	31	31	30	31	31	31	29	31	30	30	32	28	31	31	31	29	31	31	30	31
Monthly Rainfall (mm)	185	244	567	220	122	10	648	26	86	205	53	30	128	97	59	95	21	10	11	59	39	28
Year Rain to Date (mm)	185	429	996	1,216	1,338	1,348	1,996	2,022	2,108	2,313	2,366	2,397	128	225	284	378	399	409	419	478	517	546
Storage Tank Totalised Flow (m^3)	115,204	117,077	129,243	143,827	159,540	174,121	188,568	199,416	212,894	223,143	231,393	235,974	244,228	248,601	250,136	251,537	252,866	253,356	257,097	257,098	257,098	257,654
Storage Tank Volume Transferred (m^3)	2,149	1,873	12,166	14,584	15,713	14,581	14,447	10,848	13,478	10,249	8,250	4,581	8,254	4,373	1,535	1,401	1,329	490	3,741	1	-	556
Storage Tank Transfer Average (m^3/day)	69	67	392	470	524	470	466	350	465	331	275	153	258	156	50	45	43	17	121	0	-	18
Groundwater Totalised Flow (m^3)	26,637	28,510	30,081	31,964	36,923	39,213	40,395	42,875	45,178	48,532	51,012	53,182	55,182	57,001	59,419	61,620	64,100	66,565	69,200	72,835	75,295	76,495
Groundwater Transfer (m^3)	2,199	1,873	1,571	1,883	2,250	2,290	1,182	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Surface Water / Organics Transfer (m^3)	-	-	6,663	7,431	9,863	13,855	-	3,617	11,845	6,035	2,221	1,222	8,254	4,373	1,535	1,401	1,329	289	-	-	-	556
Leachate Transferred (m^3)			3,932	5,270	3,600	726	13,265	7,231	1,633	4,214	6,029	3,359	-	-	-	-	-	201	3,741	1	-	-
LUCAS HEIGHTS 2																						
LH2 Transfer Totalised Flow (m^3)	260,534	271,455	285,612	300,570	313,883	325,760	338,710	349,561	361,054	372,531	383,333	393,748	405,474	416,441	429,344	442,520	455,358	465,966	475,450	487,942	502,225	515,541
LH2 Total Leachate Transferred (m^3)	12,872	10,921	14,157	14,958	13,313	11,877	12,950	10,851	11,493	11,477	10,802	10,415	11,726	10,967	12,903	13,176	12,838	10,608	9,484	12,492	14,283	13,316
LH2 Stage 5/3 Totalised Flow (m^3)	46,233	48,097	52,850	57,013	60,300	63,158	67,908	71,129	73,244	76,215	79,179	81,317	83,403	85,113	86,963	88,784	90,580	91,787	92,681	93,467	94,142	94,925
LH2 Stage 5/3 Total Generation (m^3)	2,407	1,864	4,753	4,163	3,287	2,858	4,750	3,221	2,115	2,971	2,964	2,138	2,086	1,710	1,850	1,821	1,796	1,207	894	786	675	783
LH2 Stage 5/3 Daily Average (m^3/day)	78	67	153	134	110	92	153	104	73	96	99	71	65	61	60	59	58	42	29	25	23	25
Harrington's Quarry Totalised Flow (m^3)	85,091	85,847	87,218	88,698	90,018	90,766	91,407	92,683	93,252	93,949	95,350	96,551	97,607	98,441	99,271	99,927	100,309	100,660	100,993	101,301	101,575	101,838
Harrington's Quarry Month Total Generation (m^3)	819	756	1,371	1,480	1,320	748	641	1,276	569	697	1,401	1,201	1,056	834	830	656	382	351	333	308	274	263
Harrington's Quarry Daily Average Generation (m^3)	26	27	44	48	44	24	21	41	20	22	47	40	33	30	27	21	12	12	11	10	9	8
LH2 Dam to Emergency Dam Totalised Flow (m^3)	145,351	151,143	159,992	166,577	177,373	185,464	196,357	204,884	210,512	217,204	224,330	229,992	236,025	241,489	247,680	254,020	260,664	267,861	274,258	279,542	285,303	291,180
LH2 Dam to Emergency Dam Transfer Volume (m^3)	5,953	5,792	15,783	13,483	10,796	8,091	10,893	8,527	5,628	6,692	7,126	5,662	6,033	5,464	12,532	12,858	13,561	14,830	12,811	10,734	11,718	11,941
LH2 Dam to Emergency Dam High Flow Transfer Volume			6,934	6,898	10,618	7,481	10,701	8,433	5,692	6,936	7,347	5,827	6,180	5,644	6,341	6,518	6,917	7,633	6,414	5,450	5,957	6,064
Emergency Dam to LH2 Dam Totalised Flow (m^3)	202,938	213,724	225,275	240,179	262,248	277,829	297,250	315,332	328,458	344,149	360,980	374,754	386,096	396,801	409,397	422,329	434,796	445,605	458,712	470,971	485,059	498,185
Emergency Dam to LH2 Dam Transfer Volume (m^3)	12,688	10,786	11,551	14,904	22,069	15,581	19,421	18,082	13,126	15,691	16,831	13,774	11,342	10,705	12,596	12,932	12,467	10,809	13,107	12,259	14,088	13,126
LH2 Leachate Storage Dam Total Volume (m^3)	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000
LH2 Leachate Storage Dam Level (%)	47	57	75	85	76	65	69	60	62	78	66	61	63	62	69	72	77	75	71	73	72	67
LH2 Leachate Storage Dam Available Volume (m^3)	4,224	3,408	1,968	1,200	1,904	2,792	2,512	3,208	3,056	1,784	2,752	3,160	2,952	3,056	2,504	2,216	1,864	2,000	2,344	2,200	2,224	2,640
LH2 Emergency Dam Total Volume (m^3)	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
LH2 Emergency Dam Level (%)	44	53	98	92	86	85	89	81	74	64	45	25	38	43	44	46	57	82	82	74	59	49
LH2 Emergency Dam Available Volume (m^3)	5,620	4,730	200	800	1,390	1,460	1,070	1,880	2,640	3,610	5,480	7,480	6,250	5,750	5,650	5,420	4,310	1,770	1,780	2,590	4,140	5,080
LH2 Dam / LH2 Emergency Dam Accumulation (m^3)	1,348	1,706	5,970	168	- 1,294	- 958	670	- 1,506	- 608	302	- 2,838	- 2,408	1,438	396	652	518	1,462	2,404	- 354	- 666	- 1,574	- 1,356
LH2 Leachate Generated for the Period	14,220	12,627	24,059	20,396	15,619	11,645	26,885	16,576	12,518	15,993	13,993	11,366	13,164	11,363	13,555	13,694	14,300	13,213	12,871	11,827	12,709	11,960
LH2 Leachate Generation (m^3/day)	459	451	776	658	521	376	867	535	432	516	466	379	411	406	437	442	461	456	415	382	424	386

Attachment 3

Site arrangements



JAN - DEC 2022



JAN-OCT 2023

LEGEND:

- RE-PROFILING BOUNDARY
- ACTIVE CELL
- INTERMEDIATE COVER - PLATFORM
- INTERMEDIATE COVER - SLOPES
- EXISTING CAP
- FINAL CAP - PLATFORM
- FINAL CAP - SLOPES

N

0 50 100 150 200 250m

SCALE 1:5000 AT ORIGINAL SIZE

PRELIMINARY

rev	description	app'd	date
B	REVISED LABELLING	AR	22.12.23
A	INITIAL ISSUE		11/12/23

CLEANAWAY PTY LTD
LUCAS HEIGHTS RRP

LEACHATE CALIBRATION PERIOD SITE ARRANGEMENTS

GHD

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scale 1:5000 for A1 job no. 21-27039
date DEC 2023 rev no. B

approved (PD) SK001

Plot Date: 22 December 2023 - 4:05 PM Plotted by: Alison Hofyck Cad File No: \\ghdnet\ghd\AU\Sycney\Projects\21\12625448\CADD\Drawings\12625488-SK001_2023 leachate calibration.dwg

Attachment 4

Calibration model

Lucas Heights WMF - 2022

Wet conditions model

LANDFILL GENERATION	2022	
Tip face	2,500	m2
Daily cover	10,000	m2
Existing cap 2%	156,320	m2
Existing cap 10%	-	m2
Stripped cap	20,000	m2
Intermediate cover 5%	368,973	m2
Intermediate cover slopes	418,328	m2
New final cap 5%	68,490	m2
New final cap slopes	25,521	m2
Post closure cap 5%	-	m2
Post closure cap slopes	-	m2
OTHER GENERATION		
Lucas Heights 1 landfill (average)	332	m3/day
Harringtons quarry	20.0	m3/day
Groundwater collection system	30.00	m3/day
Cell 5.3 excavation catchment area	51,773	m2
CONTAINMENT		
Operational containment capacity	17,500	m3
Emergency containment dam capacity	10,000	m3
Operational containment surface area	11,500	m2
Operational containment basal area	4,500	m2
Operational containment catchment area	13,820	m2
Initial Pond Volume	0.4	vol/vol
Cell 5.3 excavation containment area	-	m2
Pan Evaporation Percentage - winter	70%	
Pan Evaporation Percentage - autumn, spring	80%	
Pan Evaporation Percentage - summer	90%	
DISPOSAL		
Assumed leachate treatment rate (kL/day)	900	kL/d
Assumed leachate disposal rate (kL/day)	1000	kL/d

Parameter		Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Annual Total mm	Annual Total m3	Percent
		31	28	31	30	31	30	31	31	30	31	30	31			
Precipitation (mm)																
Rainfall (BOM)	(mm)	186.4	243.6	567.1	223.5	126.4	10.0	647.9	26.5	99.4	204.6	53.3	30.4	2419		100%
Pan Evaporation																
Evaporation (BOM)	(mm)	172.0	126.8	105.0	77.2	55.2	39.5	42.3	61.2	88.0	112.7	168.2	179.9	1228		51%
Pan evaporation	(mm)	154.8	114.1	84.0	61.8	44.2	27.7	29.6	42.8	70.4	90.2	134.6	161.9	1016		42%
Leachate - Calculated using HELP (mm)																
Tip face		42.1	24.2	31.1	141.8	357.1	197.8	159.3	74.5	22.0	93.7	15.5	123.7	1283	3207	53%
Daily cover		64.5	33.5	38.4	95.8	211.6	164.5	101.3	21.4	33.6	61.5	18.7	118.0	963	9629	40%
Existing cap 2%		2.1	5.6	22.9	19.5	116.4	167.9	38.9	38.9	10.3	42.7	7.8	69.0	542	84731	22%
Existing cap 10%		2.2	6.2	18.8	19.6	88.5	122.2	36.3	13.7	5.1	35.0	1.8	61.8	411	0	17%
Stripped cap		17.1	19.0	1.1	63.7	147.4	24.4	40.7	0.0	21.2	20.8	17.2	45.5	418	8363	17%
Intermediate cover 5%		7.5	13.6	0.0	57.3	54.0	0.0	14.1	0.0	24.0	9.6	18.5	21.1	220	81073	9%
Intermediate cover slopes		2.8	7.7	0.0	54.9	25.4	0.0	2.8	0.0	25.5	1.1	24.4	11.9	157	65484	6%
New final cap 5%		10.6	10.9	8.1	10.7	12.2	11.2	9.8	10.0	9.1	10.2	9.5	10.2	122	8382	5%
New final cap slopes		7.2	9.4	8.4	11.3	12.0	10.3	10.6	9.2	12.7	8.0	8.9	10.3	118	3016	5%
Post closure cap 5%		11.2	7.0	10.0	9.9	12.5	10.2	12.0	9.4	10.7	8.7	10.6	10.9	123	0	5%
Post closure cap slopes		8.7	6.8	9.0	10.0	12.8	12.4	11.0	9.7	9.3	10.1	8.1	11.7	120	0	5%
Total Leachate Collected	(m3/month)	**6,269**	**10,878**	**4,835**	**50,767**	**55,879**	**29,911**	**15,608**	**7,400**	**22,892**	**12,871**	**19,677**	**26,898**		**263,885**	
Other leachate sources	(m3/month)															
Lucas Heights 1 landfill (average)		10,292	9,296	10,292	9,960	10,292	9,960	10,292	10,292	9,960	10,292	9,960	10,292		121,180	
Harringtons quarry		620	560	620	600	620	600	620	620	600	620	600	620		7,300	
Leachate containment pond																
Rainfall into Pond	(m3)	2,576	3,367	7,837	3,089	1,747	138	8,954	366	1,374	2,828	737	420		33,432	
Evaporation From Pond	(m3)	1,130	833	690	507	363	260	278	402	578	740	1,105	1,182		8,068	
Net Leachate Generation	(m3)	**18,627**	**23,267**	**22,895**	**63,908**	**68,175**	**40,349**	**35,196**	**18,276**	**34,247**	**25,870**	**29,868**	**37,048**		**417,729**	
Leachate treatment capacity	(m3/month)	**27,900**	**25,200**	**27,900**	**27,000**	**27,900**	**27,000**	**27,900**	**27,900**	**27,000**	**27,900**	**27,000**	**27,900**		**328,500**	
Required containment		**0**	**0**	**0**	**36,908**	**77,183**	**90,533**	**97,829**	**88,205**	**95,453**	**93,423**	**96,291**	**105,439**			
Operational containment volume	(m3)	**0**	**0**	**0**	**17,500**	**17,500**	**17,500**	**17,500**	**17,500**	**17,500**	**17,500**	**17,500**	**17,500**			
Operational containment volume	(%)	**0%**	**0%**	**0%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**			
Emergency containment volume	(m3)	**0**	**0**	**0**	**10,000**	**10,000**	**10,000**	**10,000**	**10,000**	**10,000**	**10,000**	**10,000**	**10,000**			
Emergency containment volume	(%)	**0%**	**0%**	**0%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**			
Remaining leachate	(m3)	**0**	**0**	**0**	**9,408**	**49,683**	**63,033**	**70,329**	**60,705**	**67,953**	**65,923**	**68,791**	**77,939**			
Leachate level fluctuation	m	**-**	**-**	**-**	**1.75**	**4.25**	**5.00**	**5.50**	**5.00**	**5.25**	**5.25**	**5.25**	**5.75**			
Sources of water to sewer																
Cell 5.3 excavation catchment generation	(m3)	9,651	12,612	29,361	11,571	6,544	518	33,544	1,372	5,146	10,593	2,760	1,574		125,245	
Groundwater collection system	(m3)	930	840	930	900	930	900	930	930	900	930	900	930		10,950	
Sewer disposal capacity	(m3/month)	**31,000**	**28,000**	**31,000**	**30,000**	**31,000**	**30,000**	**31,000**	**31,000**	**30,000**	**31,000**	**30,000**	**31,000**		**365,000**	
Remaining capacity for disposal to sewer	(m3/month)	**5,373**	**4,733**	**8,105**	**3,000**	**3,100**	**3,000**	**3,100**	**3,100**	**3,000**	**3,100**	**3,000**	**3,100**			
Containment in excavation (assume empty at start of year)	(m3)	**4,278**	**12,157**	**33,413**	**41,984**	**45,429**	**42,946**	**73,390**	**71,662**	**73,809**	**81,301**	**81,061**	**79,535**			

Lucas Heights WMF - Nov 2022 - Oct 2023

Average conditions model

LANDFILL GENERATION	2022	2023	
Tip face	2,500	2,500	m2
Daily cover	10,000	10,000	m2
Existing cap 2%	156,320	160,041	m2
Existing cap 10%	-	-	m2
Stripped cap	20,000	20,000	m2
Intermediate cover 5%	368,973	202,659	m2
Intermediate cover slopes	418,328	443,059	m2
New final cap 5%	68,490	161,272	m2
New final cap slopes	25,521	111,155	m2
Post closure cap 5%	-	-	m2
Post closure cap slopes	-	-	m2

OTHER GENERATION		
Lucas Heights 1 landfill (average)	270	m3/day
Harringtons quarry	15.0	m3/day
Groundwater collection system	10.00	m3/day
Cell 5.3 excavation catchment area	51,773	m2

CONTAINMENT		
Operational containment capacity	17,500	m3
Emergency containment dam capacity	10,000	m3
Operational containment surface area	11,500	m2
Operational containment basal area	4,500	m2
Operational containment catchment area	13,820	m2
Initial Pond Volume	0.78	vol/vol
Cell 5.3 excavation containment area	-	m2
Pan Evaporation Percentage - winter	70%	
Pan Evaporation Percentage - autumn, spring	80%	
Pan Evaporation Percentage - summer	90%	

DISPOSAL		
Assumed leachate treatment rate (kL/day)	900	kL/d
Assumed leachate disposal rate (kL/day)	1000	kL/d

Parameter		Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Annual Total mm	Annual Total m3	Percent
		30	31	31	28	31	30	31	30	31	31	30	31			
Precipitation (mm)																
Rainfall (BOM)	(mm)	53.3	30.4	128.0	96.8	58.8	94.6	20.5	10.0	10.6	58.8	39.0	28.4	629		100%
Pan Evaporation																
Evaporation (BOM)	(mm)	168.2	179.9	205.2	151.4	126.0	97.1	78.7	54.4	52.2	94.7	124.7	142.9	1475		234%
Pan evaporation	(mm)	151.4	161.9	164.2	121.1	100.8	68.0	55.1	38.1	41.8	75.8	99.8	114.3	1192		189%
Leachate - Calculated using HELP (mm)																
Tip face		6.3	82.3	80.5	24.1	19.2	31.2	18.5	8.8	11.5	0.4	0.0	19.1	302		48%
Daily cover		5.8	53.0	57.3	17.0	12.6	30.7	6.6	11.7	14.1	6.6	5.1	25.1	246		39%
Existing cap 2%		4.3	11.2	55.7	2.0	13.9	12.2	5.1	0.0	1.6	0.0	0.0	3.6	110		17%
Existing cap 10%		1.8	7.8	36.9	0.4	12.1	9.0	2.7	0.0	0.4	0.0	0.0	2.0	73		12%
Stripped cap		4.2	26.2	24.2	4.7	5.2	14.8	0.7	0.6	4.8	0.0	0.0	8.1	94		15%
Intermediate cover 5%		1.2	23.9	1.2	5.0	1.6	6.5	0.0	0.0	3.1	0.0	0.0	3.0	46		7%
Intermediate cover slopes		0.0	16.1	0.4	4.4	0.0	4.8	0.0	0.0	2.3	0.0	0.0	0.8	29		5%
New final cap 5%		3.5	3.1	3.6	4.2	3.3	3.7	2.7	4.0	2.9	4.1	1.9	3.1	40		6%
New final cap slopes		3.6	3.1	4.5	2.4	3.2	3.7	3.9	3.8	3.0	3.3	2.2	3.2	40		6%
Post closure cap 5%		3.4	3.8	4.4	2.6	3.7	3.8	4.8	2.6	3.6	4.5	1.4	1.9	40		6%
Post closure cap slopes		3.3	3.6	3.5	3.5	3.8	4.0	3.3	3.4	3.3	3.9	1.1	3.0	40		6%
Total Leachate Collected	(m3/month)	**1,592**	**18,825**	**11,666**	**4,529**	**3,718**	**7,065**	**1,826**	**1,217**	**2,990**	**1,101**	**599**	**2,867**		**57,996**	
Other leachate sources	(m3/month)															
Lucas Heights 1 landfill (average)		8,100	8,370	8,370	7,560	8,370	8,100	8,370	8,100	8,370	8,370	8,100	8,370		98,550	
Harringtons quarry		450	465	465	420	465	450	465	450	465	465	450	465		5,475	
Leachate containment pond																
Rainfall into Pond	(m3)	737	420	1,769	1,338	813	1,307	283	138	146	813	539	392		8,696	
Evaporation From Pond	(m3)	1,508	1,613	1,839	1,357	1,129	870	705	488	468	849	1,118	1,281		13,225	
Net Leachate Generation	(m3)	**9,371**	**26,467**	**20,431**	**12,490**	**12,236**	**16,052**	**10,239**	**9,418**	**11,504**	**9,899**	**8,571**	**10,814**		**157,492**	
Leachate treatment capacity	(m3/month)	**27,000**	**27,900**	**27,900**	**25,200**	**27,900**	**27,000**	**27,900**	**27,000**	**27,900**	**27,900**	**27,000**	**27,900**		**328,500**	
Required containment		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**			
Operational containment volume	(m3)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**			
Operational containment volume	(%)	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**			
Emergency containment volume	(m3)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**			
Emergency containment volume	(%)	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**			
Remaining leachate	(m3)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**			
Leachate level fluctuation	m	-	-	-	-	-	-	-	-	-	-	-	-			
Sources of water to sewer																
Cell 5.3 excavation catchment generation	(m3)	2,760	1,574	6,627	5,012	3,044	4,898	1,061	518	549	3,044	2,019	1,470		32,576	
Groundwater collection system	(m3)	300	310	310	280	310	300	310	300	310	310	300	310		3,650	
Sewer disposal capacity	(m3/month)	**30,000**	**31,000**	**31,000**	**28,000**	**31,000**	**30,000**	**31,000**	**30,000**	**31,000**	**31,000**	**30,000**	**31,000**		**365,000**	
Remaining capacity for disposal to sewer	(m3/month)	**6,979**	**4,533**	**10,569**	**15,510**	**18,764**	**13,948**	**20,761**	**20,582**	**19,496**	**21,101**	**21,429**	**20,186**			
Containment in excavation (assume empty at start of year)	(m3)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**			

APPENDIX H – Noise Monitoring Report

REPORT

LUCAS HEIGHTS RESOURCE RECOVERY PARK

LUCAS HEIGHTS, NSW

ANNUAL NOISE COMPLIANCE MONITORING
RWDI # 2302703
20 December 2023

SUBMITTED TO

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DOCUMENT CONTROL

Version	Status	Date	Prepared By	Reviewed By
A	Final	20 December 2023	Peter Thang	Justin Leong

NOTE

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GLOSSARY OF ACOUSTIC TERMS

Most environments are affected by environmental noise which continuously varies, largely as a result of road traffic. To describe the overall noise environment, a number of noise descriptors have been developed and these involve statistical and other analysis of the varying noise over sampling periods, typically taken as 15 minutes. These descriptors, which are demonstrated in the graph below, are here defined.

Maximum Noise Level (LAmax) – The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.

L_{A1} – The L_{A1} level is the noise level which is exceeded for 1% of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.

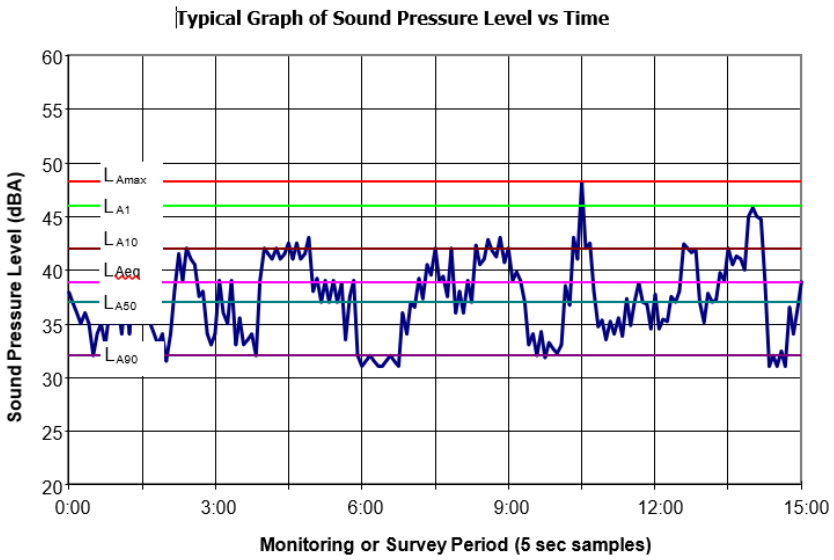
L_{A10} – The L_{A10} level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise.

L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

L_{Aeq} – The equivalent continuous sound level (L_{Aeq}) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.

ABL – The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and night time) for each day. It is determined by calculating the 10th percentile (lowest 10th percent) background level (L_{A90}) for each period.

RBL – The Rating Background Level for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period – daytime, evening and night time.



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1 INTRODUCTION

Cleanaway Recycling and Recovery (Cleanaway) operates a solid waste landfill at the Lucas Heights Resource Recovery Park (LHRRP). The LHRRP is licensed to accept solid waste from domestic and commercial sources that are suitable for disposal in a general solid (putrescible) waste landfill.

Activities on the site include:

- Landfill;
- A resource recovery centre and waste collection point;
- GO facility for processing garden organics;
- Truck parking area;

Other facilities/operations located at the LHRRP include:

- Renewable energy operations (operated by Energy Developments Ltd);
- Community use areas in the minibike area at the southern extent of the site run by Police Citizens Youth Club (PCYC) and the Sydney Clay Target Association (SICTA) on the leased land on the north western side of the site.

RWDI has been commissioned by Cleanaway to conduct compliance noise monitoring as required by the conditions outlined in Development Consent SSD 6835. The assessment has been conducted in accordance with the NSW EPA Industrial Noise Policy.

LHRRP is located in Lucas Heights, to the north of New Illawarra Road and East of Heathcote Road. To the north, west and south of the site is primarily bushland. Bushland, and the Australian Nuclear Science and Technology Organisation (ANSTO) are located to the east.

The nearest residential receivers, located to the north and east are described below:

- R1 – Engadine residences, approximately 2 km to the southeast;
- R2 – Barden Ridge residences, approximately 3 km to the east;
- R3 – Menai residences, approximately 3.3 km to the northeast.
- R8 – The Ridgeway residences, approximately 3.2 km to the northeast

Two areas marked as potential future residential developments have also been identified. These areas have been named R6 Gandangara and R7 Gandangara North, and are located approximately 1.5 km and 1.6 km respectively from LHRRP.

An overview of the area, including receiver locations, is presented in Figure 1.

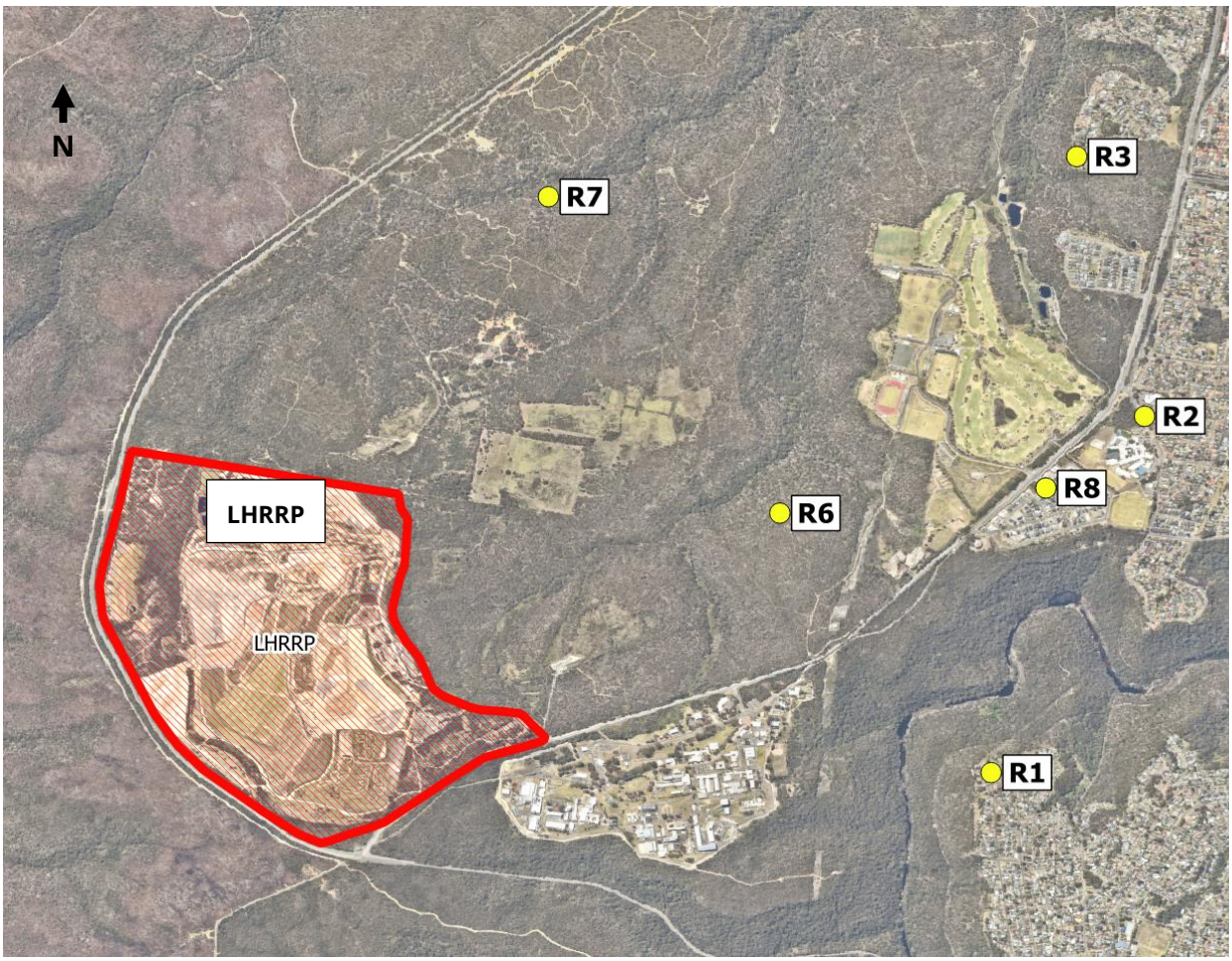

Figure 1: LHRRP and Surrounding Area

2 NOISE COMPLIANCE CONDITIONS

2.1 Lucas Heights Resource Recovery Park

Conditions for compliance have been outlined in Schedule C of Development Consent SSD 6835. Conditions from this consent relevant to noise are presented below:

C53. The Applicant shall comply with the hours detailed in Table 2, unless otherwise agreed in writing by the EPA or the Secretary.

Table 2: Hours of Work

Facility	Activity	Day	Time
Landfill	Construction	Monday – Friday Saturday – Sunday	7 am – 5 pm 8 am – 5 pm
	Operation	Monday – Friday Saturday Sunday	5 am – 5 pm 6 am – 5 pm 8 am – 5 pm
	Other operations	Monday – Sunday	Anytime
GO Facility	Construction	Monday – Friday Saturday – Sunday	7 am – 5 pm 8 am – 5 pm
	Operation	Monday – Friday Saturday – Sunday	6 am – 5 pm 8 am – 5 pm
	Other operations	Monday – Sunday	Anytime
ARRT Facility	Construction	Monday – Friday Saturday – Sunday	7 am – 5 pm 8 am – 5 pm
	Operation	Monday – Sunday	Anytime

C54. The Applicant shall ensure noise from the site does not exceed the noise limits in Table 3.

Table 3: Noise Limits dB(A)

No.	Location	Day $L_{eq(15min)}$	Evening $L_{eq(15min)}$	Night $L_{eq(15min)}$	Night $L_{1(1min)}$
R1	Engadine	35	35	35	45
R2	Barden Ridge	35	35	35	45
R3	Menai	35	35	35	45

No.	Location	Day $L_{eq(15min)}$	Evening $L_{eq(15min)}$	Night $L_{eq(15min)}$	Night $L_{1(1min)}$
R6	Gandangara	37	37	37	45
R7	Gandangara North	35	35	35	45
R8	The Ridgeway	35	35	35	35

C56. The Applicant shall monitor noise from the site to demonstrate compliance with the noise limits in Table 3. The monitoring shall be:

(a) undertaken annually, or to address genuine noise complaints that are related to the site as determined by the EPA or the Secretary;

(b) in accordance with the NSW Industrial Noise Policy; and

(c) reported to the EPA and the Secretary within one month of completing the monitoring, including details of management actions taken and the effectiveness of the actions to address any exceedances of the limits in Table 3.

3 NOISE MEASUREMENTS

3.1 Lucas Heights Resource Recovery Park

Noise measurements were conducted on Tuesday 12 December 2023 at the six locations outlined in the Development Consent and in Figure 1. A 15-minute measurement was taken at each location. Based on the degree of audibility or likelihood of compliance further measurements would be taken up to a maximum of 1 hour at each location.

The weather during the measurements was slightly overcast with moderate wind.

All measurements were conducted using an NTi XL2 Sound Level Meter. This sound level meter conforms to AS IEC 61672.2-2019 Electroacoustics – Sound level meters Pattern evaluation tests as a Class 1 Precision Sound Level Meter which has an accuracy suitable for field and laboratory use. The A-Weighting filter of the meter was selected, and the time weighting was set to "Fast". The calibration of the meter was checked before and after the measurements with a B&K 4231 sound level calibrator and no significant drift was noted.

The sound level meter and sound level calibrator have been laboratory calibrated within the previous two years in accordance with our in-house Quality Assurance Procedures.

A summary of the measurements is presented in Table 1. A summary of the observed noise environment for each location is presented in the section below the table. Analysis of the noise contribution from LHRRP at these locations is presented in Section 4.

Table 1: Summary of Attended Measurements

Location	Start Time	$L_{Aeq,15\ min}$	$L_{A90,15\ min}$	Noise audible from LHRRP
R1 – Engadine	2:49 PM	41	34	No
R2 – Barden Ridge	1:51 PM	60	46	No
R3 – Menai	1:26 PM	47	42	No
R6 – Gandangara	11:28 AM	48	40	No
R7 – Gandangara North	9:08 AM	47	34	No
R8 – The Ridgeway	10:41 AM	60	48	No

R1 The measurement was taken near 42 Sierra Road, Engadine. The background level at this location was dominated by road noise from New Illawarra Road (A6) and by rustling leaves from wind through nearby trees. The L_{Aeq} level was dominated by local birds and intermittent insect noise and passing vehicles on Sierra Road. No noise from the LHRRP was audible at this location throughout the measurement period.

R2 This measurement was taken at 157 Old Illawarra Road, Barden Ridge. The background level was dominated by road noise originating from New Illawarra Road (A6) and by rustling leaves from wind through nearby trees. The L_{Aeq} level was controlled by local traffic along Old Illawarra Road as well as intermittent noise from birds and insects in the area. No noise from the LHRRP was audible at this location.

R3 This measurement was taken at 23 Windle Place, Menai. The background level at this location was once again dominated by the road noise from New Illawarra Road (A6) and by rustling leaves from wind through nearby trees. The L_{Aeq} level was controlled primarily by insect and bird noise in the local area. No noise from the LHRRP was audible throughout the measurement period.

R6 This measurement was taken at the location specified in Figure 1. The background level was dominated by road noise from the A6 Highway, and the L_{Aeq} level was controlled by intermittent insect and bird noise. No noise from the LHRRP site was audible throughout the measurement period.

R7 This measurement was taken at the location specified in Figure 1. The background level at this location was dominated by the constant hum of traffic from Heathcote Road and insect noise. The L_{Aeq} level was controlled primarily by birds and louder, intermittent insect noise. No noise from the LHRRP site was audible throughout the measurement period.

R8 This measurement was taken at 3 Gurrumul Street, Barden Ridge. The background level was dominated by road noise originating from New Illawarra Road (A6). The L_{Aeq} level was controlled by local traffic along New Illawarra Road (A6) and Gurrumul Street as well as intermittent noise from birds and insects in the area. No noise from the LHRRP was audible at this location.

4 NOISE ASSESSMENT

Considering that no noise from the site was audible at any of the measurement locations (as discussed in Section 3.1), noise level contributions from the LHRRP site have been derived based on the measurements taken on Tuesday December 12, 2023. Inaudibility is often defined as being at least 10 dB lower than the minimum noise level recorded, and the site noise contribution in Table 2 has been calculated using this metric.

Table 2: LHRRP Noise Compliance Summary

Location	Minimum Recorded Level	Estimated Site Noise Contribution L_{Aeq}	Noise limit $L_{Aeq,15min}$	Compliance
R1	36	< 26	35	Yes
R2	32	< 22	35	Yes
R3	38	< 28	35	Yes
R6	37	< 27	37	Yes
R7	32	< 22	35	Yes
R8	42	< 32	35	Yes

Given that no noise from the site was audible at any time at locations R1, R2, R3, R6, R7 or R8, the estimated noise from the LHRRP complies with the consent conditions at all locations.

5 CONCLUSIONS

The Lucas Heights Resource Recovery Park is required to conduct annual compliance noise monitoring as outlined in Development Consent SSD 6835. This report details the annual monitoring that took place on 12 December 2023.

Noise contributions from the LHRRP at the surrounding residential receivers have been measured and assessed. The assessment found that all the relevant noise requirements of the Development Consent have been complied with.

6 STATEMENT OF LIMITATIONS

This report entitled Lucas Heights Resource Recovery Park was prepared by RWDI Australia Pty Ltd ("RWDI") for Cleanaway ("Client"). The findings and conclusions presented in this report have been prepared for the Client and are specific to the project described herein ("Project"). The conclusions and recommendations contained in this report are based on the information available to RWDI when this report was prepared. Because the contents of this report may not reflect the final design of the Project or subsequent changes made after the date of this report, RWDI recommends that it be retained by Client during the final stages of the project to verify that the results and recommendations provided in this report have been correctly interpreted in the final design of the Project.

The conclusions and recommendations contained in this report have also been made for the specific purpose(s) set out herein. Should the Client or any other third party utilize the report and/or implement the conclusions and recommendations contained therein for any other purpose or project without the involvement of RWDI, the Client or such third party assumes any and all risk of any and all consequences arising from such use and RWDI accepts no responsibility for any liability, loss, or damage of any kind suffered by Client or any other third party arising therefrom.

Finally, it is imperative that the Client and/or any party relying on the conclusions and recommendations in this report carefully review the stated assumptions contained herein and to understand the different factors which may impact the conclusions and recommendations provided.

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