Quarterly Environmental Monitoring Report (QEMR)
Q1 December 2023

Address: **Dunmore Recycling & Waste Depot**
44 Buckleys Road,
Dunmore, NSW, 2529

Project No.: **ENRS0033**

Date: **December 2023**

ENVIRONMENT & NATURAL RESOURCE SOLUTIONS
ENRS PTY LTD ABN 68 600 154 596
T 02 4448 5490 F 02 4448 5490
E: projects@enrs.com.au www.enrs.com.au

Author and Document Control

Written / Submitted By	Reviewed / Approved By
 Taite Beeston (BSc.) Geologist & Environmental Consultant	

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Executive Summary

Environment & Natural Resource Solutions (ENRS Pty Ltd) were commissioned as independent environmental consultants by ALS Environmental (Wollongong) on behalf of Shellharbour City Council (SCC) to prepare the Quarterly Environmental Monitoring Report (AEMR) for the Dunmore Recycling and Waste Depot (herein referred to as the Site).

This (QEMR) summarises the results of field testing and laboratory analysis conducted by ALS for the first quarter (1) 2023-2024 monitoring period, and provides the necessary data assessment and analysis to meet requirements of the Site's Environment Protection Licence/s (EPL's); No.5984 and No.12903.

The Site was established in 1945 and has been managed by Shellharbour City Council (SSC) since 1983. The Site accepts putrescible and non-putrescible waste within its managed landfill cell. Recycling activities conducted at the site include Resource Recovery Centre, Revolve Centre and Food Organics and garden Organics (FOGO) processing.

In late 2020 to July 2021 Shellharbour City Council moved away from sole reliance on traditional onsite leachate management techniques through initiating a secondary leachate treatment option in which leachate was transported from site for processing at a contractor facility.

In early 2021 Shellharbour City Council constructed a new Leachate Treatment Plant (LTP) on site, which was commissioned in July/August 2021. The LTP is comprised of three primary biological treatment units, including an anoxic reactor, nitrifying reactor, and sequencing batch reactor. The treated stream meets Sydney Water requirements for discharge into Sydney Water sewer, under a trade waste agreement. On average the LTP discharges 60kL/day of treated water, equating to approximately 22ML of leachate removal from site per annum.

Waste regulation in NSW is administered by the EPA under the Protection of the Environment Operations (POEO) Act (1997); the Waste Avoidance and Resource Recovery Act (2001).

The Site operates under the conditions of two (2) EPLs:

- EPL No. 5984. Landfill activities. Consisting of; extractive activities, waste disposal and composting.
- EPL No. 12903. Resource recovery activities. Consisting of; composting and waste storage within the FOGO Facilities and Resource Recovery Centre.

A copy of the relevant EPL sections outlining the sampling requirements is provided in Appendix A (EPL No. 5984). ENRS note that EPL No. 12903 does not specify sample points.

The objectives of this AEMR are to:

- Meet the environmental monitoring requirements of Sites EPLs; No. 5984 and 12903;
- Assess and analyse the environmental monitoring data for the Site against NSW EPA endorsed criteria;
- Identify trends of the environmental monitoring data over the reporting period;
- Identify any on-site or off-site impacts associated with operation of the Site;
- Advise SCC if the current environmental monitoring program is providing adequate information to identify potential environmental impacts from existing operations (if any) and provide recommendations on improvement to the monitoring program if required; and

- Document monitoring results in a Quarterly Environmental Monitoring Report.

The scope of work for this QEMR comprised the collation, assessment and reporting of Site data made available to ENRS from the December 2023 monitoring event in regard to the following tasks:

- Review previous reports and document the hydrogeological setting;
- Tabulate results of all monitoring data for both water and dust samples, collected and provided by ALS as required by the EPLs for the respective reporting period.
- Analysis and interpretation of all monitoring data (water, dust and landfill surface gas);
- Review all quarterly environmental monitoring reports from the 2020 reporting period and available data from the last three (3) years;
- Identification of any deficiencies in environmental performance identified by the monitoring data, trends or environmental incidents, and identification of remedial actions taken or proposed to be taken to address these deficiencies; and
- Recommendations on improving the environmental performance of the facility including improvement to the monitoring program.

Based on the findings obtained during the December 2023 Q1 monitoring program the following conclusions and recommendations are provided:

- Shallow groundwater flow is expected to mimic topography with low hydraulic gradients flowing towards the south and southeast towards Rocklow Creek. The nearest sensitive receptors are likely to include; recreational users of the Minnamurra River estuary environs; down gradient stakeholders; and downgradient alluvial aquifers, swamps, Rocklow Creek, Minnamurra River and Groundwater Dependent Ecosystems near discharge zones;
- Groundwater throughout the monitoring period reported exceedances of the assessment criteria for; ammonia, heavy metals, nitrate and salinity (EC) within multiple groundwater bores. These exceedances were considered to be within historical values with no significant change in site conditions;
- Offsite sample locations within Rocklow Creek generally reported satisfactory results. However, exceedances for ammonia were above the ecological stressor value;
- Surface gas methane monitoring reported satisfactory results all within the adopted assessment criteria;
- Methane levels of enclosed structures on or withing 250m of deposited waste or leachate storage were tested and found to be below the acceptable threshold for 1% (volume/volume) in all cases;
- Dust deposition gauges generally recorded satisfactory results below the guidelines provided in AS3580.10.1. Monitoring should continue in accordance with EPL 5984 requirements;
- Based on this review of the December 2023 Q1 monitoring period, contaminants associated with the landfill cell, leachate dam/s and general site uses are considered to be relatively consistent with the range of historical results;
- Flare temperatures fell below the required KPI of 760 degrees Celsius on one occasion. The reader is referred to the LGI Flare Reports provided in **Appendix G**;
- Should any change in Site conditions or incident occur which causes a potential environmental impact, a suitable environmental professional should be engaged to further assess the Site and consider requirements for any additional monitoring; and
- This report must be read in conjunction with the attached Statement of Limitations.

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1 Introduction

Environment & Natural Resource Solutions (ENRS Pty Ltd) were commissioned as independent environmental consultants by ALS Environmental (Wollongong) on behalf of Shellharbour City Council (SCC) to prepare the Quarterly Environmental Monitoring Report (AEMR) for the Dunmore Recycling and Waste Depot (herein referred to as the Site).

This (QEMR) summarises the results of field testing and laboratory analysis conducted by ALS for the first quarter (1) 2023-2024 monitoring period, and provides the necessary data assessment and analysis to meet requirements of the Site's Environment Protection Licence/s (EPL's); No.5984 and No.12903.

1.1 Project Background

1.1.1 Site History

The Site was established in 1945 and has been managed by Shellharbour City Council (SSC) since 1983. The Site accepts putrescible and non-putrescible waste within its managed landfill cell. Recycling activities conducted at the site include Resource Recovery Centre, Revolve Centre and Food Organics and garden Organics (FOGO) processing.

In late 2020 to July 2021 Shellharbour City Council moved away from sole reliance on traditional onsite leachate management techniques through initiating a secondary leachate treatment option in which leachate was transported from site for processing at a contractor facility.

In early 2021 Shellharbour City Council constructed a new Leachate Treatment Plant (LTP) on site, which was commissioned in July/August 2021. The LTP is comprised of three primary biological treatment units, including an anoxic reactor, nitrifying reactor, and sequencing batch reactor. The treated stream meets Sydney Water requirements for discharge into Sydney Water sewer, under a trade waste agreement. On average the LTP discharges 60kL/day of treated water, equating to approximately 22ML of leachate removal from site per annum.

1.2 EPL Requirements

Waste regulation in NSW is administered by the EPA under the Protection of the Environment Operations (POEO) Act (1997); the Waste Avoidance and Resource Recovery Act (2001).

The Site operates under the conditions of two (2) EPLs:

- EPL No. 5984. Landfill activities. Consisting of; extractive activities, waste disposal and composting.
- EPL No. 12903. Resource recovery activities. Consisting of; composting and waste storage within the FOGO Facilities and Resource Recovery Centre.

A copy of the relevant EPL sections outlining the sampling requirements is provided in Appendix A (EPL No. 5984). ENRS note that EPL No. 12903 does not specify sample points.

1.3 Objectives

The objectives of this AEMR are to:

- Meet the environmental monitoring requirements of Sites EPLs; No. 5984 and 12903;
- Assess and analyse the environmental monitoring data for the Site against NSW EPA endorsed criteria;
- Identify trends of the environmental monitoring data over the reporting period;
- Identify any on-site or off-site impacts associated with operation of the Site;
- Advise SCC if the current environmental monitoring program is providing adequate information to identify potential environmental impacts from existing operations (if any) and provide recommendations on improvement to the monitoring program if required; and
- Document monitoring results in a Quarterly Environmental Monitoring Report.

1.4 Scope of Work

The scope of work for this QEMR comprised the collation, assessment and reporting of Site data made available to ENRS from the December 2023 monitoring event in regard to the following tasks:

- Review previous reports and document the hydrogeological setting;
- Tabulate results of all monitoring data for both water and dust samples, collected and provided by ALS as required by the EPLs for the respective reporting period.
- Analysis and interpretation of all monitoring data (water, dust and landfill surface gas);
- Review all quarterly environmental monitoring reports from the 2020 reporting period and available data from the last three (3) years;
- Identification of any deficiencies in environmental performance identified by the monitoring data, trends or environmental incidents, and identification of remedial actions taken or proposed to be taken to address these deficiencies; and
- Recommendations on improving the environmental performance of the facility including improvement to the monitoring program.

2 Site Identification

2.1 Site Identification

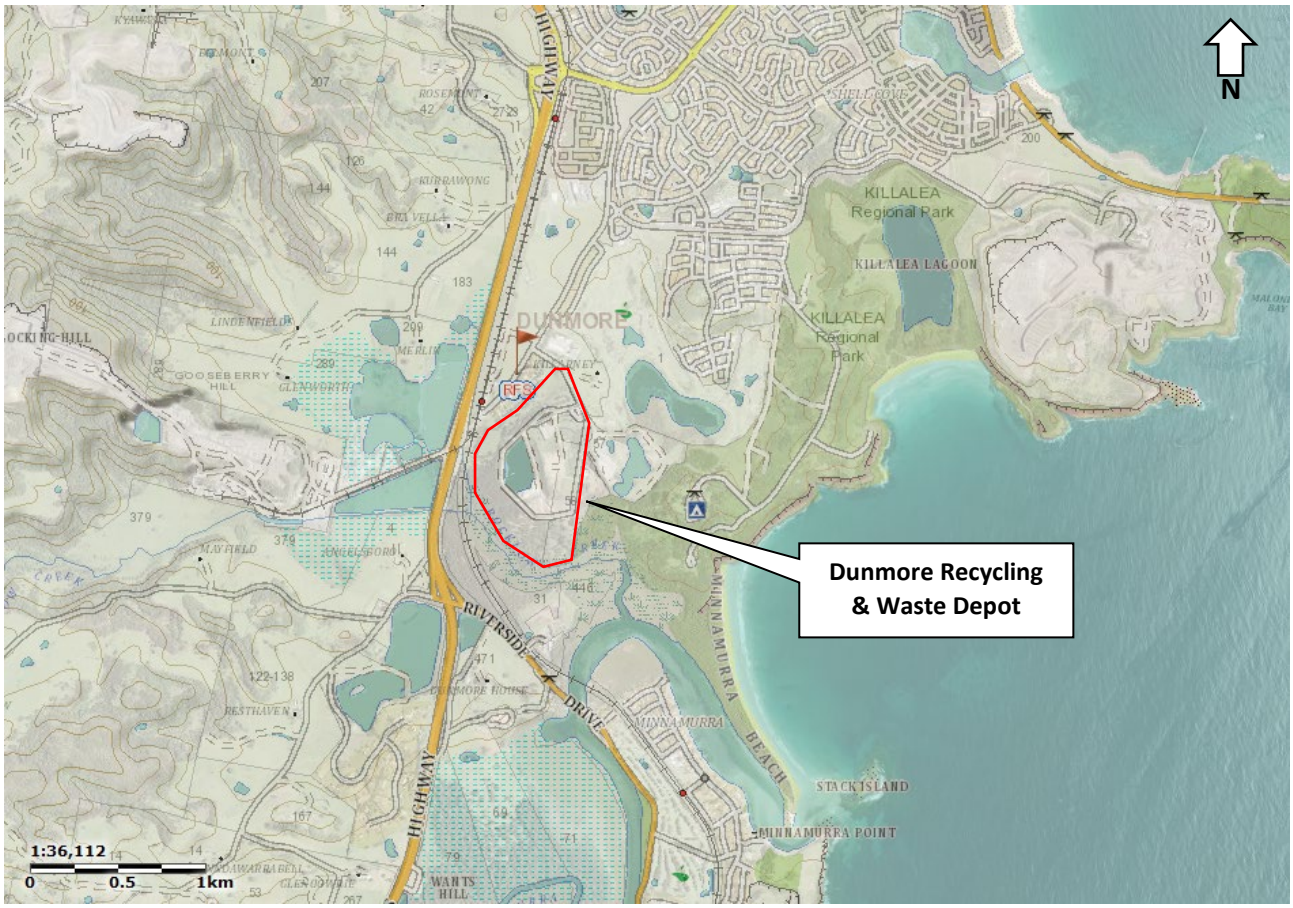
The Site is located at 44 Buckleys Road, Dunmore, NSW, 2529, legally defined as Lot 21 in Deposited Plan 653009 and Lot 1 Deposited Plan 419907. The Site is situated approximately three and a half (3.5) kilometres southwest of the Shellharbour town centre. The area's regional location is defined in **Figure 2-1** below. Details of the Site boundary and sampling points are provided in the Site Plan as **Figure 14-1**. The key features required to identify the Site are summarised in **Table 2-1**.

Table 2-1: Site Identification

Site	Description
Site name	Dunmore Recycling and Waste Depot
Street address	44 Buckleys Road, Dunmore, NSW 2529

Site	Description
Property description	-
(Lot / Deposited Plan)	21 / 653009 and 1 / 419907
Easting/Northing (GDA2020) (approximate centre of Site)	Zone 56H Easting: 302280 Northing: 6168169 (Approximate centre of Site)
Current owners	Shellharbour City Council
Current occupiers	Shellharbour City Council
Site area (total)	72.36 hectares
Site dimensions	Irregular shaped block. Please refer to **Figure 14-1.**
Areas excluded or inaccessible	Assessment was limited to the available data for the sample points listed in the EPL
Local government area	Shellharbour City Council
Current zoning	RU1 Primary Production
Locality map	Albion Park 9028
Trigger for assessment	Reporting requirements of EPL 5984
State or Local government statutory controls	• EPL 5984; • EPL 12903; • Contaminated Land Management Act 1997; • Environment Protection Act 1997; • Environment Protection Regulation 2005. Resilience and Hazards SEPP; • Work Health and Safety Act 2011; • Work Health and Safety Regulations 2011; • Waste Avoidance and Resource Recovery Act (2001).
Legal permissions to access the Site obtained or required	N/A. ENRS did not access the Site.
Consent of adjoining landowners and/or occupiers to access land (if required)	N/A. Not required for this scope of work.

Figure 2-1 Project Location



Source: https://maps.six.nsw.gov.au/ (cited 1/11/2023)

2.2 Surrounding Land Use

The current activities and operations on adjacent properties and the surrounding area include:

Table 2-2: Summary of surrounding land use

Direction	Land Use
North	Buckleys Road, commercial infrastructure and open grassland. Residential dwellings along the northwest border of the Site. Golf course further to the northeast.
East	Dunmore Resources and Recycling facility immediately to the east, bushland to the southeast.
South	Bushland, Rocklow Creek (300m from landfill activities). Further to Kiama Community Recycling Centre and Riverside Drive.
West	Bushland to the southwest, scattered trees immediately to the west and further to the Princes Highway. Boral Quarries complex beyond the Highway. Residential dwellings to the Northwest.

2.2.1 Sensitive Receptors

The nearest sensitive receptors are likely to include:

- Recreational users of the Minnamurra River estuary environs;
- Neighbouring and down gradient stakeholders;
- Ecological receptors - flora and fauna.
- Shallow soil, groundwater and stormwater – vertical and lateral migration of contaminants (if any) and connectivity with shallow groundwater, drainage waterways and nearby tributaries; and
- Down gradient alluvial aquifers, swamps, Rocklow Creek, Minnamurra River and Groundwater Dependent Ecosystems (GDE) near discharge zones.

2.3 Topography

A review of the current series Albion Park (90281N) 1:25,000 topographic map sheet was conducted to assess the regional topography and to identify potential runoff and groundwater controls in the region. Topography provides a useful indicator for groundwater controls including gradient and flow path.

The Site presents low topographic relief, remaining between approximately 3-5 mAHD across the entirety of the Site. The regional topographic gradient trends south-southeast towards Rocklow Creek and Minnamurra River.

2.4 Soil Landscape

Review of the Sites soil landscape was conducted with reference to the Kiama 1:100,000 soil landscape map. The Site was mapped as underlain by organic, black, massive sandy loam topsoil overlying loose bleached light grey sand with iron staining in the subsoil.

Review of the online *Shellharbour City Council* Acid Sulphate Soil Risk Map indicates that the Site lies within a **Class 3** area, suggesting that works beyond 1 metre below the ground level (mbGL) have the potential to encounter Acid Sulphate Soils.

2.5 Geology

A review of the Site geology was undertaken with reference to the Wollongong 1:250,000 geological series sheet (Si56.9) and the Shellharbour-Kiama area coastal quaternary 1:50,000 geology sheet (See Figure 4). The Site is predominately underlain by the Quaternary alluvial deposits (Qal) characterised as Holocene backbarrier flat; marine sand, silt, clay, gravel and shell (Qhbf). The northern most corner of the site is intersected by the Gerringong Volcanics (Pbb) characterised by Latite. Based on the mapped geology, previous investigations and borehole logs, the Site infrastructure including the landfill cell is located within the alluvial deposits.

2.6 Hydrogeology

Groundwater resources in the area are expected to be associated with Shallow unconfined alluvial and unconsolidated systems, generally less than 20 m in depth with moderate to high transmissivity, variable water quality, and strongly controlled by rainfall recharge.

2.6.1 Existing Bores

A network of groundwater monitoring bores is installed at the Site to provide specific data on the quality and nature of groundwater. Given the spatial distribution of the bores and disturbed ground condition expected within the land fill cell, groundwater contours could not be accurately mapped.

A review of the NSW Office of Water (NOW) existing bore records was conducted to develop the conceptual understanding of regional groundwater conditions, including aquifer depths, yields, water quality, and distribution. A search of the Bureau of Meteorology Australian Groundwater Explorer groundwater database identified a total of eighty-eight (88) registered bores within one and a half (1.5) kilometres of the Site (see Figure 5). Registered bores in the area are predominantly associated with the Landfill Site and with the quarry complex (Boral Site) to the west of the EPL Site. The majority of bores are registered for monitoring purposes, excluding a single well (GW044447), which is registered for stock and domestic purposes. The stock bore is located approximately one (1) kilometre to the north of the Site, on the western side of the Princes Highway, which is considered to be up gradient of the Site and not in direct hydraulic connectivity. Registered bore depths are between 1.25 m and 22 m. Bore records indicate shallow unconsolidated aquifer systems.

2.6.2 Flow Regime

Previous reports (Environmental Earth Sciences, 2018) have identified that groundwater flows vary across the Site, but the general trend is south, towards Rocklow Creek.

Based on the unconfined nature of the aquifers, the shallow groundwater flow is inferred to mimic topography with low to moderate hydraulic gradients flowing towards the south.

The Site and adjoining land, was largely unsealed with potential for local recharge from rainfall infiltration. Likely discharge areas are predominantly to the south and east of the Site including swamps and Rocklow Creek. The waterbodies surrounding the Site are recognised as State Environmental Planning Policy No.14 (SEPP14) registered wetlands and Proximity Areas for Coastal Wetlands border the eastern, southern and western boundaries of the Site.

2.7 Surface Water

The Site topography indicates that surface water flow will generally trend to the east towards off Site wetlands and southeast towards Rocklow Creek. These present the primary regional drainage structures for natural surface water and runoff. A series of stormwater infrastructure is present at the Site which is expected to capture run off. Infrastructure includes but not limited to; stormwater drains; sedimentation ponds; levee banks; collection and diversion drains; and leachate dams.

3 Assessment Criteria

ENRS have adopted the most appropriate criteria in accordance with current state and national guidelines. Where available, Australian and NSW EPA endorsed guidelines have been referenced in preference to international standards.

3.1 Water Quality Guidelines

Nationally developed guidelines are provided in the National Water Quality Management Strategy (NWQMS): Guidelines for Groundwater Protection in Australia (ARMCANZ & ANZECC;2013). The relevant criteria to protect environmental values are provided in **Table 3-1**:

Table 3-1: Water Quality Assessment Criteria

Environmental Value	Relevant Guideline
Ecosystems / Health Screening Levels	• ANZG (2018) (Australian and New Zealand Guidelines for Fresh and Marine Water Quality); • ASC NEPM (2013); and • Health Screening Levels for Petroleum Hydrocarbons in Soil & Groundwater (CRC CARE, Sept. 2011)
Drinking Water	• Australian Drinking Water Guidelines (ADWG)

3.1 Groundwater & Surface water Assessment Criteria

The ANZG (2018) provide default guideline values (DGVs) for four (4) levels of protection categorised by the percent of species possibly affected, being 80%, 90%, 95% or 99% of species. Where DGVs are not available reference is made against the ANZECC (2000) Trigger Values (TV). The NSW Office of Water (DECCW;2007) endorsed groundwater management guidelines recommend assessment for aquatic ecosystems based on the 95 per cent of species level of protection. This assessment has adopted the assessment criteria considered most appropriate for the contaminants of concern based on the Site's EPL and results provided by ALS. The adopted TV for the Site Assessment Criteria (SAC) are summarised in **Table 3-2** below.

Table 3-2: Groundwater & Surface Water Assessment Criteria

Analyte	Units	Fresh Water[A]	Marine Water[A]	Drinking Water[B]	
				Health	Aesthetic
Chloride	mg/L	-	-	-	250
Calcium	mg/L	-	-	-	-
Magnesium	mg/L	-	-	-	-
Sodium	mg/L	-	-	-	180
Potassium	mg/L	-	-	-	-
Manganese	mg/L	1.9	-	0.5	0.1
Total iron	mg/L	-	-	-	0.3
Dissolved iron	mg/L	-	-	-	0.3
Fluoride	mg/L	-	-	1.5	-
Ammonia as N[C]	mg/L	0.91 (pH 8)	0.91 (pH 8)	-	0.5
Nitrate as N	mg/L	0.7	-	50	-
Nitrite as N	mg/L	-	-	3	-
Total Organic Carbon	mg/L	-	-	-	-
Bicarbonate alkalinity as CaCO3	mg/L	-	-	-	-
Total alkalinity as CaCO3	mg/L	-	-	-	-
Sulfate as SO4 - turbidimetric	mg/L	-	-	-	250
Dissolved Oxygen - % Saturation (surface water only)	%	85-110%	-	-	-
Suspended Solids (SS) (surface water only)	mg/L	-	-	-	-

Analyte	Units	Fresh Water[A]	Marine Water[A]	Drinking Water[B] Health	Drinking Water[B] Aesthetic
Turbidity (surface water only)	NTU	-	-	-	5
pH	pH	6.5-8.5		6.5-8.5	6.5-8.5
Electrical Conductivity	µS/cm	2200	-	-	-

Table notes:
Criteria is only provided for the analytes test by ALS and listed within EPL 5984.
A: Investigation levels apply to typical slightly-moderately disturbed systems. See ANZECC & ARMCANZ (2000) for guidance on applying these levels to different ecosystem conditions.
B: Investigation levels are taken from the health values of the Australian Drinking Water Guidelines (NHMRC 2011).
D. Criteria for ammonia. See Section 3.1.1:

3.1.1 Ammonia Assessment criteria

In addition to the default TV of 0.91mg/L (pH 8) for ammonia, Table 3.3.2 of the ANZECC (2000) also provides stressor values for physical and chemical stressors for south-east Australia for slightly disturbed ecosystems. The table provides a stressor guideline for ammonia of **0.2mg/L** at pH 8 for lowland rivers. For the purposes of this assessment, the value has been applied to all water samples, excluding the leachate tank.

pH specific ammonia TVs. Additional sample point specific pH dependant trigger values for total ammonia were also adopted when a sample was outside of 8 pH units. Sample specific values were based on Table 8.3.7 of the ANZECC (2000). The additional criteria and results are presented in **Table 14-2** attached.

3.2 Dust Deposition Assessment Criteria

Criteria for collection and assessment of dust deposition concentrations are provided within the Australian standard AS3580.10.1 - Methods for sampling and analysis of ambient air; method 10.1-Determination of particulate matter - Deposited matter - Gravimetric method. AS3580.10.1 provides an acceptable level of 4 g/m2/month.

3.3 Surface Methane Gas Assessment Criteria

The NSW EPA Solid Waste Landfill Guidelines 2nd Edition (2016) provides sampling methodologies and threshold for surface methane gas concentrations at landfill sites. The acceptable threshold for capped landfills is 500 parts per million (ppm) at 5 cm above the capping surface.

3.4 Gas Accumulation Assessment Criteria within Enclosed Structures

The NSW EPA Solid Waste Landfill Guidelines 2nd Edition (2016) provides sampling methodologies and threshold gas levels to ensure that gas is not accumulating within enclosed structures on or within 250m of deposited waste or leachate storage. The acceptable threshold for 1% (volume/volume).

4 Data Quality Objectives (DQO)

If sampling is conducted, Data Quality Objectives (DQO) are required to define the quality and quantity of data needed to support management decisions. The process for establishing DQO's is documented in the National Environment Protection (Assessment of Site Contamination) Measure (NEPC;2013).

4.1 Step 1: State the problem

The Site is currently operating as an active landfill and requires regular environmental monitoring in accordance with the EPL 5984.

4.2 Step 2: Identify the decision/goal of the study

The primary goals / objectives of the investigation program were to:

- Meet the environmental monitoring requirements of Sites EPLs; No. 5984 and 12903;
- Assess and analyse the environmental monitoring data for the Site against NSW EPA endorsed criteria;
- Identify trends of the environmental monitoring data over the reporting period;
- Identify any on-site or off-site impacts associated with operation of the Site;
- Advise SCC if the current environmental monitoring program is providing adequate information to identify potential environmental impacts from existing operations (if any) and provide recommendations on improvement to the monitoring program if required; and
- Document monitoring results in a Quarterly Environmental Monitoring Report.

4.3 Step 3: Identify the information inputs

The provided results shall be used to identify any risks to the sensitive receptors or change in site conditions. The following inputs were required:

- Representative environmental samples;
- Measurements of environmental parameters;
- Comparison of the parameter results against the adopted Site Assessment Criteria (SAC);
- The completion of an Quarterly Environmental Monitoring Report.

4.4 Step 4: Define the study boundaries

The assessment was limited to sampling locations listed in EPL 5984. As listed in **Appendix A** and depicted in **Figure 14-1 - Figure 14-2**.

4.5 Step 5: Develop the analytical approach (decision rule)

The site information and results obtained from this assessment scope will be compared against the NSW EPA endorsed SAC documented in **Section 3** with considerations of the land use and nearby receptors. The decision rule process is defined by the following:

- QA/QC indicate the results are reliable;
- Laboratory Practical Quantitation Limits (PQL) or Limits of Reporting (LOR) are less than the SAC; and

- Results meet the adopted SAC and/or are within background levels and regulatory criteria.

4.6 Step 6: Specify performance or acceptance criteria

To ensure the quality of the environmental data collected during the assessment, detailed quality assurance and quality control (QA/QC) measures will be applied by ALS. The QA/QC measures will be followed from the inception of the project, during field sampling, laboratory analysis of samples and data reporting. The QAQC measures understood to have been adopted by ALS are documented in detail below within **Table 5-1**.

4.7 Step 7: Develop the plan for obtaining data

The seventh and final step involves identifying the most effective sampling and analysis design for generating the data that is required to satisfy the data quality objectives. The required sampling program is based on and accounts for the following key points:

- Requirements of Sites EPLs; No. 5984 and 12903;
- The results will be compared against the adopted SAC for the proposed land use.

The indicators (DQI) used to identify that data obtained and provided by ALS has been done so in a way which meets project data quality objectives (DQO) summarised below.

Table 4-1: Summary of Data Quality Objectives (DQO)

DQO	Evaluation Criteria
Documentation completeness	• Completion of field records, chain of custody documentation, laboratory test certificates from NATA-accredited laboratories.
Data comparability	• Use of appropriate techniques for the sampling, storage and transportation of samples. Use of NATA accredited laboratory using NEPM endorsed procedures.
Data representativeness	• Adequate sampling coverage of all required EPL sample points.
Precision and accuracy for sampling and analysis	• Use properly trained and qualified field personnel and achieve laboratory QC criteria. • Blind field duplicates to be collected at a minimum rate of 1 in 20 samples. • RPD's to be less than 30% for inorganic and 50% for organic analyses. • Rinsate samples not considered necessary as all PCoC measured by the lab were assumed to be present at the site. • Disposable single use items used for the collection of samples.

5 Sampling Methodology

Field sampling was conducted by ALS Environmental (Wollongong) as commissioned by SCC on quarterly basis. ENRS understands that sampling was conducted in accordance with ALS sampling protocols with reference to current industry standards and Code of Practices. The following sub-sections provide a summary of the sampling methodologies.

Monitoring frequency is defined by the EPL's and is designed to capture necessary site data to support assessment of Site conditions (quarterly and annual), any long-term trends or overflow events. Monitoring is conducted quarterly and annually for selected analytes with additional overflow and event-based sampling triggered by Site conditions.

5.1 Water Sampling

5.1.1 Location of Water Monitoring Points

Groundwater and surface water monitoring requirements are defined by the EPL No. 5984, as provided in Appendix A. The water sampling regime includes; five (5) surface waters, one (1) located onsite and four (4) located off-site; twelve (12) groundwater monitoring wells surrounding the landfill operations; and one (1) leachate point. Sampling locations are illustrated in Figure 2 attached.

5.1.2 Depth to Water

Prior to sampling, the depth to the groundwater table was measured from the top of casing (TOC) using a water dipper and clear disposable bailer. The bores were inspected for the presence of hydrocarbon and the thickness of any LNAPL was measured visually in clear disposable bailers. No LNAPL was reported on field sheets provided by ALS.

5.1.3 Sample Collection

Sampling is conducted independently by ALS Environmental under contract with SCC. Chain of Custody records and field sheets are provided in Appendix D. ENRS understand sampling was conducted in accordance with ALS sampling protocols.

5.1.4 Groundwater Sampling

Groundwater wells were sampled in order of distance from any areas of known contamination to ensure that lower contaminated wells are sampled before likely higher contaminated wells. Groundwater bores were purged prior to sampling by removing at least three (3) well volumes with samples being collected using clear disposal bailers or low flow parameter stabilisation methods applied with field sheets provided to document pumping volumes and field parameters. Post sampling all samples were sealed in laboratory-prepared sampling containers appropriate for the analysis.

Surface water samples were collected as 'grab samples' from the midpoint of the source at mid-depth.

Post flushing, leachate samples were sampled from a tap on the discharge line directly into purpose specific, pre preserved sample containers.

All samples were stored on ice immediately after their collection and transported to the laboratory under Chain of Custody (CoC) documentation.

Any loss of volatile compounds was kept to a minimum by employing the following sampling techniques:

- Minimal practical disturbance during sampling;
- Samples placed in sample containers as soon as possible;

- Sample containers contain zero headspace;
- Samples placed directly on ice and transported to the laboratory as soon as possible; and
- Employing the most appropriate analytical method to minimise volatile losses at the laboratory.

5.1.5 Field Testing

Field testing was conducted during bore purging and sampling to record physical water parameters. A multi-probe water quality meter was used to measure the following parameters:

- Oxygen Reduction Potential (ORP, representing redox).
- Electrical Conductivity (Salinity - EC);
- Temperature; and
- pH (Acidity).

5.2 Dust Deposition Sampling

Measurement of dust deposition was carried out in accordance with the Australian Standard AS3580.10.1 (2016). This Australian Standard provides a mean of determining the mean surface concentration of deposited matter from the atmosphere.

Dust collection gauges were set up for a one (1) month periods at during each quarterly sampling event. A total of four (4) dust monitoring locations were considered adequate to assess site conditions.

5.3 Surface Methane Gas Monitoring

The concentration of methane gas (in units of ppm) at the Site was carried out in accordance with EPA Guidelines Solid Waste Landfill 2nd Edition 2016. On the day of sampling the wind speed was below 10 km/hr. Testing was conducted using a calibrated LaserOne portable gas monitor specifically designed for landfill gas monitoring. A calibration Certificate is provided in Appendix F.

One field technician commenced data collection along transect lines in a grid pattern across the landfill surface at 25-metre spacings. A site plan depicting the sampled transect line is provide in Figure 3. Transects were recorded using a Magellan SporTrak GPS. The concentration of methane gas was measured at a height of 5 cm above the ground in areas with intermediate or final cover over the emplaced waste.

5.4 Gas Accumulation Monitoring in Enclosed Structures

The concentration of methane gas (in units of percent volume/volume) inside all enclosed structures within 250m of emplaced waste or leachate storage facility at the Site was carried out in accordance with EPA Guidelines Solid Waste Landfill 2nd Edition 2016. On the day of sampling testing was conducted using a calibrated LaserOne portable gas monitor specifically designed for landfill gas monitoring. A calibration Certificate is provided in Appendix F.

The internal methane concentrations for each enclosed structure were recorded by a field technician. A site plan depicting the location onsite of each structure provided in Figure 3. Any depressions or surface fissures away from the sampling grid were also investigated.

5.5 Laboratory Analysis

ALS, a NATA accredited laboratory, was contracted by SCC to undertake the sample analysis in accordance with current standards. Laboratory QA/QC results are detailed in the Laboratory reports contained in the appendices section of this report.

5.6 Flare Monitoring

Landfill gases (LFG) are formed through bacterial action on emplaced waste and are a normal by-product of Landfilling operations. Landfill gas is a mixture of many different gases, typically its major components include methane and carbon dioxide. Smaller concentrations of nitrogen, oxygen, ammonia, sulphides, hydrogen, carbon monoxide, and nonmethane organic compounds (NMOCs) and Volatile Organic Compounds (VOC's) may also be present.

When operated efficiently the use of a gas flare to burn landfill gas can significantly reduce emissions of methane, NMOCs and VOC's.

The flare was monitored, maintained and operated by LGI LTD. Copies of LFG reports for the relevant reporting period are included as Appendix G.

5.7 QAQC

The Quality Assurance and Quality Control (QA/QC) protocols for the sample program conducted by ALS are summarised in **Table 5-1**.

Table 5-1: Summary of QAQC for Sample Program

Protocol	Description
Sampling Team	Site personnel comprised only experienced and qualified environmental professionals trained in conducting site contamination investigations.
Sample Method	Samples obtained in laboratory prepared containers with preservatives appropriate for the required analysis.
Calibration	Equipment calibration certificates for each sampling event.
Sample Equipment	All sample equipment disposed or decontaminated between sample sites.
Field Screening	Visual and manual inspection of sample materials for potential contamination recorded on field sheets.
Chain of Custody Forms	All samples logged and transferred under appropriately completed Chain of Custody (COC) forms with Sample Receipts issued by the laboratory.
Blind Field Duplicate	At least one (1) blind field duplicate collected per 20 samples and submitted for analysis accompanied by COC forms.

6 Water Quality Results

Laboratory results for groundwater and surface water were provided to ENRS for tabulation and comparison with relevant EPL assessment criteria. A summary of results is provided in Table 3-2 with comparison against the relevant Site Assessment Criteria (SAC). The laboratory certificates of analysis are provided in Appendix B.

6.1 Overflow Results

ENRS understands that no overflow events occurred within the first quarterly monitoring period.

6.2 Physical Indicators

6.2.1 Groundwater Depth

The measured depth to groundwater was measured between 2.19 mbgl (BH-18) to 21.2 mbgl (BH-15). The Site was charactered by a shallow water table hosted in the underlying unconsolidated sand and sediments.

6.2.2 Salinity

Salinity is reported by the laboratory as either Electrical Conductivity (EC) or Total Dissolved Solids (TDS). The ANZECC guidelines document a conversion ratio for of 0.68 mg/L = 0.68 EC (µS/cm). Table 3.3.3 of the ANZECC (2000) guidelines document default TV for EC in lowland freshwater rivers between 125 µS/cm - 2,200 µS/cm (~1,500 mg/L). Marine waters may be characterised by an EC between 35,000 µS/cm - 50,000 µS/cm.

Groundwater

During the monitoring period, salinity in groundwater samples reported a relatively low degree of variance between each sampling event. The Site was generally characterised freshwater EC values in the upgradient northern portions of the Sites, tending to become more saline towards Rocklow Creek, being a tidal river system. The results were all considered to be in range of historical values.

Surface Waters

Surface water samples collected from Rocklow Creek reported elevated EC values between 3,980 µS/cm (SW_Up) and 5,220 µS/cm (SWC_Down). EC values were expected to be elevated and fluctuate due to Rocklow Creek being a tidal system.

Results for onsite surface water location SWP1 was reported at 526 µS/cm which was below the adopted TV. The results were generally in range of historical data and considered satisfactory.

Leachate

Leachate salinity was 8,410 µS/cm which was above the TV. The result was generally in range of historical data. Salinity in leachate is expected to vary significantly with leachate concentration and stormwater dilution.

6.2.3 Dissolved Oxygen

Levels of Dissolved Oxygen (DO) were measured in the field for surface waters only. DO reflects the equilibrium between oxygen-consuming processes and oxygen-releasing processes. DO can initiate redox reactions resulting in the uptake or release of nutrients. Low DO concentrations can result in adverse effects on many aquatic organisms which depend on oxygen for their efficient metabolism. At reduced DO concentrations many compounds become increasingly toxic, for example Zinc, Lead, Copper, phenols, cyanide, hydrogen sulphide and Ammonia.

The ANZG (2018) guidelines Table 3.3.2 outlines a range between 85% to 110% saturation for low land rivers. Assuming a water temperature of 18°C this is equivalent to approximately 7-11 mg/L or ppm. DO is reported by the laboratory in mg/L which be converted to a percentage.

Surface Waters

Dissolved Oxygen within onsite surface water location SWP-1 was 3.81mg/L or 46.14%. Results were generally below the TV and were consistent with historical data.

Results for DO within offsite surface water locations within Rocklow Creek ranged from 5.81 mg/L or 70.36% (SWC_Down 2) and to 6.60 mg/L or 79.92% (SWC-Down). The results were generally consistent with the historical data.

Leachate

Dissolved oxygen within leachate tank LP1 was 3.4 mg/L or 41.17%. The results were generally in range of the historical data.

6.2.4 pH

pH is a measure of hydrogen activity. pH determines the balance between positive hydrogen ions (H+) and negative hydroxyl ions (OH-) and provides a test of water acidity (low pH) or alkalinity (high pH). Most natural freshwaters have a pH in the range 6.5 to 8.0. Changes in pH may affect the physiological functioning of biota and affect the toxicity of contaminants. Both increases and decreases in pH can result in adverse effects, although decreases are likely to cause more significant problems. Low pH indicates acidic conditions which may increase the mobility of heavy metals, whilst high pH indicates alkaline conditions which may also generate Ammonia. Previous investigations of other regional Landfill Sites in the Illawarra-Shoalhaven (Forbes Rigby;1996) report regionally acidic groundwater with low readings in the range of 4.3 pH associated with silica saturation and oxidation of accessory marcasites grains (iron sulphide).

Groundwater

Results pH in groundwater was reported between 6.60 (BH18) and 7.50 (BH19r). The results were relatively neutral and within the SAC. No exceedances were recorded. The results were considered to be satisfactory.

Surface Water

Results for pH in surface waters were all reported within the SAC and considered satisfactory.

Leachate

The pH of leachate tank LP1 was 8.60 which was above the SAC. The result was considered to be within range of historical values.

6.2.5 Total Suspended Solids (TSS)

TSS provides a measure of turbidity reported as the mass of fine inorganic particles suspended in the water. Measurement of TSS provides a valuable indication of the sediment and potential nutrient load. Elevated TSS decreases light penetration whilst phosphorus is absorbed onto sediment surfaces. TSS was measured for surface water sample points only.

Results for TSS in Rocklow Creek samples were reported between 6mg/L (SWC_Down) and 10mg/L (SWC_Up). The results were below the SAC and were considered satisfactory.

Results for TSS in onsite SWP1 was 12mg/L. The results were considered satisfactory.

6.3 Inorganic Analytes

Water samples were analysed for select nutrients including Ammonia, Ammonium, Nitrate and Nitrite. The most bio-available forms of Nitrogen are Ammonium (NH4+) and Nitrate (NO3-). Ammonia is an oxygen-consuming compound and is toxic to aquatic biota at elevated concentrations. Ammonia toxicity increases under low oxygen levels and higher pH.

6.3.1 Ammonia

Groundwater

Results for ammonia in groundwater over the monitoring period reported exceedances above the ecological stressor value of 0.2 mg/L, 95% TV of 0.91 mg/L and pH modified TV's (see Table 14-2) in all samples. Results were considered to be significantly above the SAC and within range of the previous values.

Surface Water

Ammonia in onsite surface water at SWP-1 was 0.05 mg/L which was below the SAC.

Ammonia concentrations in Rocklow Creek ranged between 0.2 mg/L (SWC_Up) and 0.27 mg/L (SWC_Down). Sample location SWC_2, SWC_Down and SW_Down 2 were reported above the ecological stressor value of 0.2 mg/L. All results were below the 95% TV and pH modified TVs. Results were considered to be within range of historical data.

Leachate

Ammonia in leachate tank LP1 was 330 mg/L which was significantly above the SAC. Elevated results may be considered characteristic of leachate. Results were within range of historical values.

6.3.2 Nitrate

Groundwater

Results for Nitrate in groundwater samples were generally reported satisfactory results below the SAC. Two (2) exceedances were reported above the Sac of 0.7mg/L of 14.00mg/L (BH4) and 0.86mg/L (BH13).

Surface Water

Nitrate concentrations for all surface water were reported below the SAC and considered satisfactory.

Leachate

Nitrate concentrations for leachate tank LP1 during the monitoring period were reported below the SAC and considered satisfactory.

6.3.3 Nitrite

Results for nitrate in all groundwater, surface water were all reported below the SAC and were considered to be satisfactory. An elevated result of 5.76mg/L was reported in Leachate Tank LP1.

6.4 Anions

6.4.1 Chloride

The results for chloride in groundwater, surface waters and leachate were reported between 11 mg/L (BH18) and 1,570 mg/L (LP1). In general, elevated chloride results were measured in Rocklow Creek, characteristic of the tidal river system. In comparison, upgradient groundwater results reported lower chloride concentrations. The leachate tank reported the highest result. Results were generally consistent with historical data.

6.4.2 Fluoride

The results for fluoride in groundwater, surface water and leachate tank were all reported below the SAC and were generally consistent with the historical data.

6.4.3 Sulphate

Results for sulphate in groundwater generally reported satisfactory results that were in range of the historical data. Higher sulphate results were reported in Rocklow Creek, which may be characteristic of the tidal river system.

6.4.4 Total Alkalinity

Surface Water

Results for total alkalinity were consistent with historical data and considered to be satisfactory.

6.4.5 Bicarbonate Alkalinity

Bicarbonate alkalinity in groundwaters were consistent with historical data and considered to be satisfactory.

6.5 Metals

6.5.1 Manganese (Total Mn)

Groundwater

Results for manganese in all groundwater, surface water and leachate tanks samples were reported below the 95% TV of 1.9 mg/L. The results were generally consistent with historical data.

6.5.2 Iron (total Fe)

Total iron was measured in surface water and leachate tank LP1 only. Results for total iron were reported between 0.37mg/L (SWP1) and 5.76 (LP1) and 1.67 mg/L. The results were generally consistent with historical data.

6.5.3 Iron (Dissolved Fe)

Concentrations of dissolved iron in groundwater reported results consistent with historical data.

6.5.4 Calcium

Results for calcium in groundwater, surface water and leachate tank LP1 were reported below the SAC and within range of historical data. The results were therefore considered satisfactory.

6.5.5 Potassium

Results for potassium in groundwater, surface water and leachate tank LP1 were reported below the SAC and within range of historical data. The results were therefore considered satisfactory.

6.6 Organic Analytes

6.6.1 Total Organic Carbon

Total Organic Carbon (TOC) provides a measure of the total concentration of organic material in a water sample. TOC is typically higher in surface water than groundwater. However, high TOC is also characteristic of leachate from landfill. TOC provides a marker for biological activity associated with contaminant degradation and can be used to delineate contaminant plumes. TOC influences geochemical processes by:

- acting as proton donors/acceptors;
- providing pH buffering;
- participating in mineral dissolution/precipitation reactions; and
- providing carbon substrate for microbe-based biodegradation.

Results for TOC in groundwater samples were generally low and consistent with historical data.

TOC in surface water samples reported satisfactory results.

TOC in leachate tank LP1 was 142mg/L which was generally consistent with historical data.

7 Dust Gauge Results

The below table provides the results of the dust depositions results. A total of four (4) dust collectors were onsite for one (1) month for each quarterly sampling round between 02/11/2023 - 01/12/2023. Sampling was conducted in general accordance with AS3580.10.1. A summary of the results is provided in Table 7-1 below.

Table 7-1: Summary of Dust Gauge Results

Quarter	Sample ID	Guideline Criteria (g/m2/month)	Total Insolvable Matter (g/m2/month)	Comment
Quarter 1	DDG1	4	0.8	Below SAC
	DDG2		0.8	Below SAC
	DDG3		1.4	Below SAC

Quarter	Sample ID	Guideline Criteria (g/m2/month)	Total Insolvable Matter (g/m2/month)	Comment
02/11/2023 - 01/12/2023	DDG4		**8.7**	Below SAC

Results for depositional dust during the December 2023 Q1 monitoring period generally reported levels of dust below the adopted assessment criteria of 4 g/m2/month. A single exceedance was report for Quarter 4 of 8.7 g/m2/month. Dust gauge locations are provided in Figure 14-1 attached. It is recommended that monitoring is continued in accordance with EPL 5984.

8 Methane Monitoring Results

8.1 Surface Gas Methane

The surface gas monitoring for the December 2023 Q1 quarterly monitoring period DID NOT detect any levels of methane above the EPA license limits of 500 ppm. The results were considered satisfactory. A table of results is provided in **Appendix D**.

8.2 Gas Accumulation Monitoring in Enclosed Structures

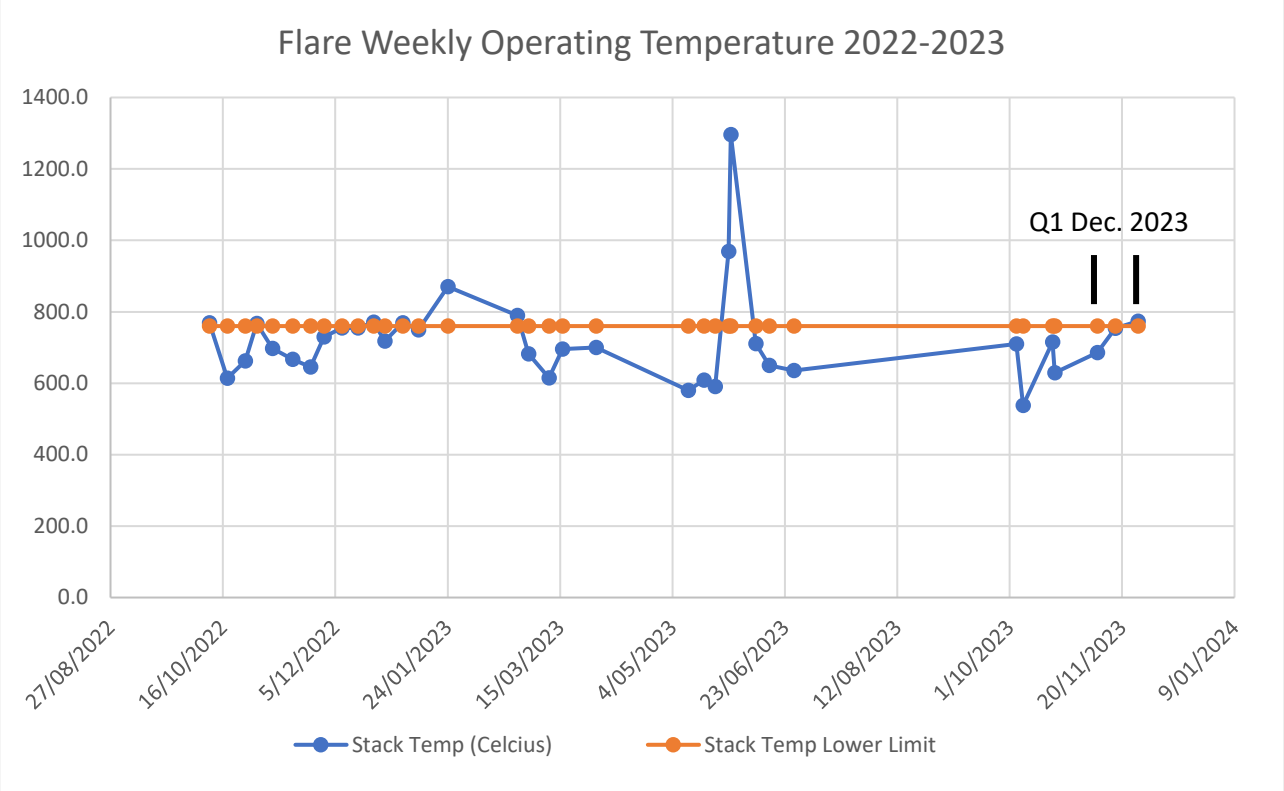
The internal methane testing for enclosed structures within 250m of the landfill during the December 2023 Q1 quarterly monitoring period DID NOT detect any levels of methane above the EPA license limits of 1% V/V. The results were considered satisfactory.

9 Flare Operations Results

Weekly average operating temperatures for the flare were supplied by LGI and displayed typical variation associated with a continuous process. Results are summarised in Chart 1 below. LGI Gas Flare reports included as **Appendix G**.

Weekly average operating temperatures supplied by LGI displayed typical variation associated with a continuous process. Weekly operating temperatures at the Flare fell below the Operational temperature Limit of 760 degrees on one (1) event on the 9/11/2023 during the quarterly monitoring period. This is in line with the historical data. The actions taken throughout to address the root causes are outlined in the LGI Gas Flare reports included as **Appendix G**. Chart 1 below depicts historical results between October 2022 and December 2023.

Chart 1: Weekly Flare Operating Temperatures 2022-2023



Notes: Data sourced form the LGI reports provided in Appendix G.

10 Quality Assurance/Quality Control Data Evaluation (QAQC)

10.1 Field Sampling QAQC

It was understood that the sample program was completed in general accordance with the ALS standard operation procedures (SOP) which references current industry guidelines.

The QAQC procedures and indicators for field sampling procedures are summarised in Table 10-1.

Table 10-1: Sampling QAQC Procedures

QAQC Indicator	Completeness	Comparability	Representativeness	Precision	Accuracy	Status: Yes	Status: No	Status: N/A	Procedures and performance
Details of sampling team	X	X				☒	☐	☐	Tertiary qualified, LAA, consistent team.

QAQC Indicator	Completeness	Comparability	Representativeness	Precision	Accuracy	Status: Yes	Status: No	Status: N/A	Procedures and performance
Reference to sampling plan/method, including any deviations from it – sampling and analysis quality plan	X					☒	☐	☐	Sampling in accordance with the SOP.
Any information that could be required to evaluate measurement uncertainty for subsequent testing (analysis)				X	X	☒	☐	☐	Field sampling records and chain of custody completed in full.
Decontamination procedures carried out between sampling events			X	X	X	☒	☐	☐	Equipment such as decontaminated between samples by washing with phosphate free detergent followed by rinsing with potable water. Re-use of sampling equipment was avoided, where possible. Single use deposable sampling equipment was the preferred method.
Logs for each sample collected, including date, time, location (with GPS coordinates if possible), sampler, duplicate samples, chemical analyses to be performed, site observations and weather/environmental (i.e. surroundings) conditions. Include any diagrams, maps, photos.		X	X			☒	☐	☐	Sampling field sheets were used as required.
Chain of custody fully identifying – for each sample – the sampler, nature of the sample, collection date, analyses to be performed, sample preservation method, departure time from the site and dispatch courier(s) (where applicable)	X	X				☒	☐	☐	COC's completed in full.

QAQC Indicator	Completeness	Comparability	Representativeness	Precision	Accuracy	Status: Yes	Status: No	Status: N/A	Procedures and performance
Field quality assurance/quality control results (e.g. field blank, rinsate blank, trip blank, laboratory prepared trip spike)				X	X	☒	☐	☐	Field QAQC analysed for chemical samples – field duplicate.
Sample splitting techniques – subsampling, containers/preservation (ensure unique ID for subsequent samples provided)			X			☒	☐	☐	Samples obtained in laboratory prepared sample containers appropriate for the analytes.
Statement of duplicate frequency			X	X		☒	☐	☐	Blind field duplicates collected at 1/20 frequency
Background sample results	X	X				☒	☐	☐	Reviewed against previous investigation results.
Field instrument calibrations (when used)				X	X	☐	☐	☒	Yes field equipment was calibrated prior to use.
Sampling devices and equipment	X	X				☒	☐	☐	Manual sampling with decontamination procedures and disposable equipment.
A copy of signed chain-of-custody forms acknowledging receipt date, time and temperature and identity of samples included in shipments	X	X				☒	☐	☐	COC's completed in full, final records from NATA laboratory attached to CoAs.

10.2 Laboratory QAQC

The QAQC procedures and indicators for laboratory analysis procedures are summarised in Table 10-2.

Table 10-2: Laboratory QAQC procedures

QAQC Indicator	Completenes	Comparability	Representativ	Precision	Accuracy	Status			Procedures and performance
						Yes	No	N/A	
A copy of signed chain-of-custody forms acknowledging receipt date, time and temperature and identity of samples included in shipments	X	X				☒	☐	☐	All samples were logged and transferred under appropriately completed Chain of Custody Forms.
Record of holding times and a comparison with method specifications	X	X				☒	☐	☐	Records documented in the laboratory QAQC report attached to CoA.
Analytical methods used, including any deviations	X	X				☒	☐	☐	Recorded in the CoA.
Laboratory accreditation for analytical methods used, also noting any methods used which are not covered by accreditation	X			X		☒	☐	☐	Recorded in the CoA.
Laboratory performance for the analytical method using inter-laboratory duplicates		X			X	☒	☐	☐	Records documented in the laboratory QAQC report attached to CoA.
Surrogates and spikes used throughout the full method process, or only in parts. Results are corrected for the recovery	X	X				☒	☐	☐	Records documented in the laboratory QAQC report attached to CoA.
A list of what spikes and surrogates were run with their recoveries and acceptance criteria (tabulate)		X			X	☒	☐	☐	Records documented in the laboratory QAQC report attached to CoA.
Practical quantification limits (PQL)	X	X				☒	☐	☐	Recorded in the CoA. PQLs <SAC.
Reference laboratory control sample (LCS) and check results	X					☒	☐	☐	Records documented in the laboratory QAQC report attached to CoA.
Laboratory duplicate results (tabulate)	X				X	☒	☐	☐	Records documented in the laboratory QAQC report attached to CoA.
Laboratory blank results (tabulate)	X				X	☒	☐	☐	Records documented in the laboratory QAQC report attached to CoA.
Results are within control chart limits	X					☒	☐	☐	Records documented in the laboratory QAQC report attached to CoA.

QAQC Indicator	Completenes	Comparability	Representativ	Precision	Accuracy	Status: Yes	Status: No	Status: N/A	Procedures and performance
Evaluation of all quality assurance/control information listed above against the stated data quality objectives, including a quality assurance/control data evaluation	X	X	X	X	X	☒	☐	☐	Records documented in the laboratory QAQC report attached to CoA.

10.3 QAQC Discussion

A summary of the Data Quality performance and evaluation is summarised in **Table 10-3** below:

Table 10-3: QAQC and Data Evaluation Summary

Objective	Performance	Status
Documentation completeness	• Completion of field records; • Chain of Custody (COC) documentation; • Calibration certificates for equipment; • NATA Laboratory Sample Receipt Notification (SRN); and • NATA laboratory Certificate of Analysis (COA). • Sample Location Plans. • Sample field sheets.	✓
Precision & accuracy for sampling & analysis	• Use only trained and qualified field personnel; • Calibration certificates for field equipment; • Appropriate sampling and field techniques; • Decontamination procedures; • Achieve laboratory QC criteria; and • Achieve QAQC requirements for RPDs and Recovery	✓
Identify Anomalies	• No elevated results not expected by the CSM; • No labelling or sample management errors; • No laboratory analyses or reporting errors	✓
DATA completeness	• Sampling density comparison meets NSW EPA (1995) 'Sampling Design Guidelines' for or all potential contaminants of concern at all areas of environmental concern; and • Systematic and judgemental sampling to provide sufficient data representative of all AECs.	✓
Data comparability	• Use of appropriate techniques for the sampling, storage and transportation of sample media; • Use of NATA certified laboratory using NEPM endorsed procedures; and • Comparison with previous site information, if any.	✓

Objective	Performance	Status
Data representative ness	• Adequate sampling coverage at all points listed in the EPL. • Selection of representative samples from each sampling location; & • Analysis for PCoC. • Achieve laboratory QC criteria. • Achieve QAQC requirements for RPDs and Recovery.	✓

The laboratory was NATA accredited, and the Practical Quantitation Limits (PQL) also referred to as Limits of Reporting (LOR) were within the acceptable levels for the investigation criteria. Laboratory certificates of analysis provided in **Appendix C** indicate that for the samples collected during the scope of works, sampling techniques, transport procedures and laboratory analysis were satisfactory. Analysis of Relative Percent Differences (RPD) was conducted of duplicates for each quarterly sampling event. RPDs calculation tables are provided in **Table 14-3** and **Table 14-4**. RPD results generally reported satisfactory differences within the criteria of 30% for organics and 50% for inorganics. Emissions of QA/QC including rinsate samples, trip blank spikes and triplicate were considered to me minor omissions, unlikely to impact the validity of the data.

In summary, the QA/QC indicators all complied with the required standards or showed variations that would have no significant effect on the quality of the data or the conclusions of this assessment. Based on the following conclusions it is therefore determined that, for the purposes of this study, the QA/QC results are valid, and ***the quality of the data is acceptable for use in this assessment:***

- The data was representative of site conditions;
- The data was complete with comprehensive records available from all field work undertaken, and all areas of concern sampled and analysed;
- The data was comparable for samples analysed at different times, and consistent with field observations; and
- The data was precise and accurate based on the laboratory achievement of relevant quality control criteria.

11 Quarterly Environmental Assessment

11.1 Monitoring Point Summary

Field measurements and NATA laboratory results for dust and methane results from the December 2023 quarter 1 monitoring period reported satisfactory results. Water results including leachate, groundwater, onsite and offsite surface water reported concentrations of analytes within the range historical values. Key indicators of leachate were detected and reported above the adopted site assessment criteria.

Groundwater and surface water within the Site boundary generally reported multiple high level exceedances of analytes indicative of leachate. Offsite sample locations within Rocklow Creek generally reported results consistent with previous monitoring events with exceedances over the ecological stressor values for ammonia.

All dust gauges reported satisfactory results over the June 2023 monitoring period.

Results of surface methane gas monitoring recorded satisfactory results. The landfill surface cap was therefore considered intact and effective during the monitoring period.

Gas accumulation monitoring reported satisfactory results for all enclosed structures within 250m of emplaced waste or leachate storage facility.

Results for flare monitoring reported consistent temperatures below the minimum operating temperature throughout the December 2023 Q1 monitoring period.

11.2 Environmental Management

11.2.1 Landfill Operations

ENRS understand 'solid' waste (general solid waste putrescible and non-putrescible) landfill operations are ongoing at the Site. Landfill practices should be conducted in accordance with the Site's Landfill Environmental Management Plan (LEMP) and the EPA Solid Waste Landfill Guidelines (EPA; 2016).

11.3 Environmental Safeguards

Appropriate management actions are required to continue to prevent and detect potential groundwater and surface water pollution. The nearest sensitive receptors for any uncontrolled Site water and leachate include; areas of adjoining bushland; recreational users of the Minnamurra River estuary environs, down gradient stakeholders; and down gradient alluvial aquifers, swamps, Rocklow Creek, Minnamurra River and Groundwater Dependent Ecosystems (GDE).

It is recommended that any drainage and detention structures are inspected annually by a suitably qualified environmental professional to assess their structural integrity and identify the need for any maintenance (such as removal of deep rooted vegetation, sediment, and re-lining).

Access tracks to sampling points should be inspected and maintained prior to each quarterly sampling events.

Continue to review surface and groundwater monitoring results from up and down gradient of the land fill cells and offsite sampling locations within Rocklow Creek. Continue to monitor surface methane gas in order to assess the capping integrity of the landfill cells.

11.4 Monitoring Program

The Site's EPL's and monitoring regime should be reviewed annually.

Review of the December 2023 Q1 monitoring results indicated no significant change in environmental conditions at the Site over the past three (3) years. Future sampling events should continue to monitor the key indicators of leachate within ground and surface waters, especially concentration of ammonia and nitrate.

Should monitoring continue to report any significant changes in analyte concentrations the need for additional monitoring locations should be reviewed, including additional groundwater monitoring bores both up and down gradient locations of areas with analytical exceedances.

It is recommended that water quality results from future monitoring rounds continue be forwarded to a suitably qualified environmental professional for review within the laboratory holding time to

compare against relevant guidelines and identify any irregularities so that additional testing may be conducted within the sample holding time.

12 Conclusions

Based on the findings obtained during the December 2023 Q1 monitoring program the following conclusions and recommendations are provided:

- Shallow groundwater flow is expected to mimic topography with low hydraulic gradients flowing towards the south and southeast towards Rocklow Creek. The nearest sensitive receptors are likely to include; recreational users of the Minnamurra River estuary environs; down gradient stakeholders; and downgradient alluvial aquifers, swamps, Rocklow Creek, Minnamurra River and Groundwater Dependent Ecosystems near discharge zones;
- Groundwater throughout the monitoring period reported exceedances of the assessment criteria for; ammonia, heavy metals, nitrate and salinity (EC) within multiple groundwater bores. These exceedances were considered to be within historical values with no significant change in site conditions;
- Offsite sample locations within Rocklow Creek generally reported satisfactory results. However, exceedances for ammonia were above the ecological stressor value;
- Surface gas methane monitoring reported satisfactory results all within the adopted assessment criteria;
- Methane levels of enclosed structures on or withing 250m of deposited waste or leachate storage were tested and found to be below the acceptable threshold for 1% (volume/volume) in all cases;
- Dust deposition gauges generally recorded satisfactory results below the guidelines provided in AS3580.10.1. Monitoring should continue in accordance with EPL 5984 requirements;
- Based on this review of the December 2023 Q1 monitoring period, contaminants associated with the landfill cell, leachate dam/s and general site uses are considered to be relatively consistent with the range of historical results;
- Flare temperatures fell below the required KPI of 760 degrees Celsius on one occasion. The reader is referred to the LGI Flare Reports provided in **Appendix G**;
- Should any change in Site conditions or incident occur which causes a potential environmental impact, a suitable environmental professional should be engaged to further assess the Site and consider requirements for any additional monitoring; and
- This report must be read in conjunction with the attached Statement of Limitations.

13 References

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14 Limitations

This report and the associated services performed by ENRS are in accordance with the scope of services set out in the contract between ENRS and the Client. The scope of services was defined by the requests of the Client, by the time and budgetary constraints imposed by the Client, and by the availability of access to Site.

ENRS derived the data in this report primarily from visual inspections, and, limited sample collection and analysis made on the dates indicated. In preparing this report, ENRS has relied upon, and presumed accurate, certain information provided by government authorities, the Client and others identified herein. The report has been prepared on the basis that while ENRS believes all the information in it is deemed reliable and accurate at the time of preparing the report, it does not warrant its accuracy or completeness and to the full extent allowed by law excludes liability in contract, tort or otherwise, for any loss or damage sustained by the Client arising from or in connection with the supply or use of the whole or any part of the information in the report through any cause whatsoever.

Limitations also apply to analytical methods used in the identification of substances (or parameters). These limitations may be due to non-homogenous material being sampled (i.e. the sample to be analysed may not be representative), low concentrations, the presence of 'masking' agents and the restrictions of the approved analytical technique. As such, non-statistically significant sampling results can only be interpreted as 'indicative' and not used for quantitative assessments.

The data, findings, observations, conclusions and recommendations in the report are based solely upon the state of Site at the time of the investigation. The passage of time, manifestation of latent conditions or impacts of future events (e.g. changes in legislation, scientific knowledge, land uses, etc) may render the report inaccurate. In those circumstances, ENRS shall not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on, the contents of the report.

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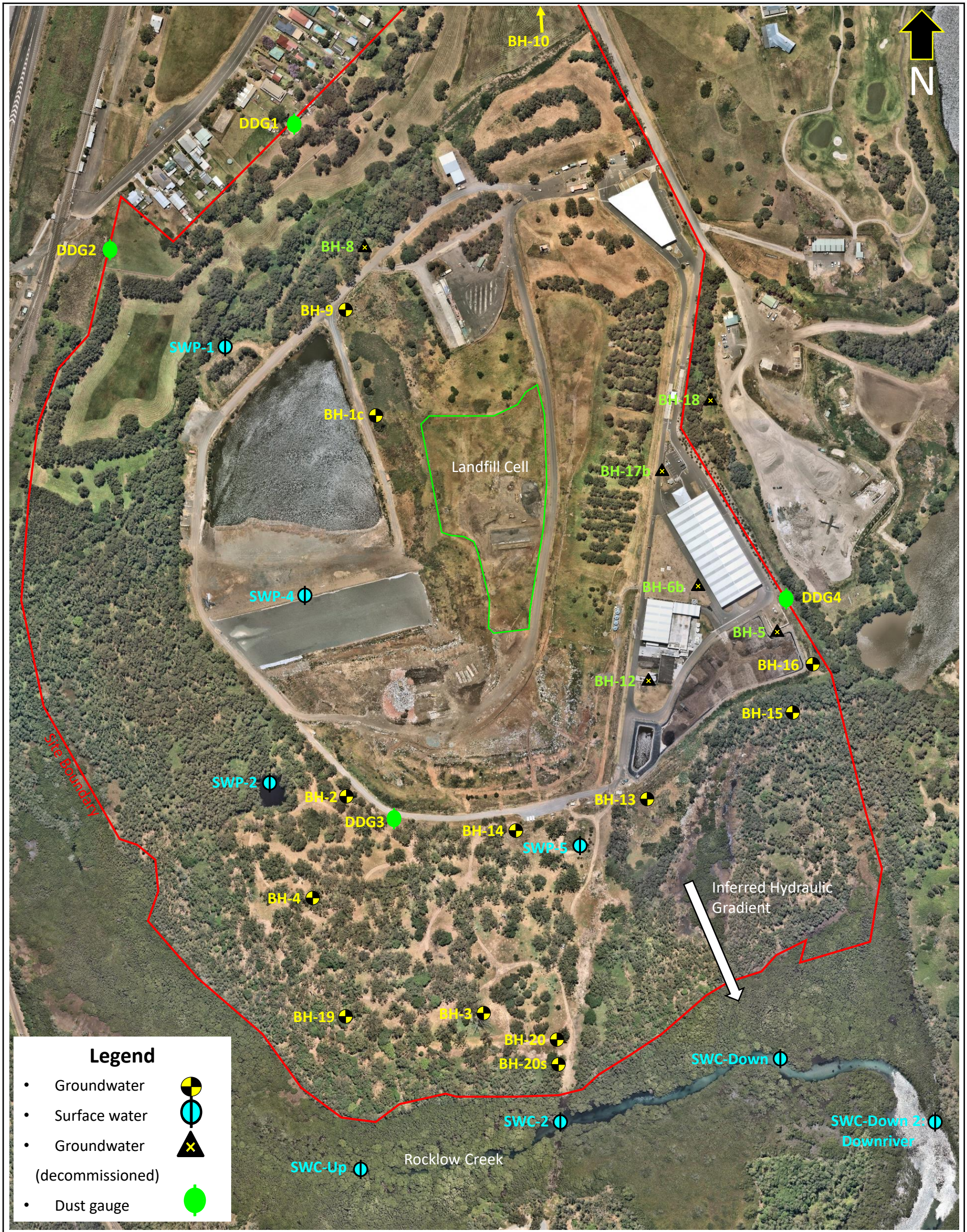
It is the responsibility of the Client to accept if the Client so chooses any recommendations contained within and implement them in an appropriate, suitable and timely manner.

FIGURES



ENRS
Environment & Natural Resource Solutions
108 Jerry Bailey Road, Shoalhaven Heads, NSW, 2535
Tel: 02 4448 5490 Fax: 02 90374708
projects@enrs.com.au www.enrs.com.au

Client:	**Shellharbour City Council**	Drawn:	**PL**	Figure:	**14-1**
Project:	**ENRS0033**	Source:	**NearMaps**	Date:	**4/02/2020**
Location:	Dunmore Recycling & Waste Depot 44 Buckleys Rd, Dunmore, NSW, 2529	Scale:	**NA**	Title:	**Site Plan**
		Status:	**Rev 1**		

ENRS
Environment & Natural Resource Solutions
108 Jerry Bailey Road, Shoalhaven Heads, NSW, 2535
Tel: 02 4448 5490 Fax: 02 90374708
projects@enrs.com.au www.enrs.com.au

Client:	**Shellharbour City Council**	Drawn:	**PL**	Figure:	**14-2**
Project:	**ENRS0033**	Source:	**SixMaps**	Date:	**16/01/2020**
Location:	Dunmore Recycling & Waste Depot 44 Buckleys Rd, Dunmore, NSW, 2529	Scale:	**NA**	Title:	**Surface Gas Sample transects**
		Status:	**Rev 1**		

TABLES

TABLE 14-1: Total Concentration Results

Quarterly Water Monitoring Results - December 2023: Dunmore Recycling and Waste Depot

GILs -Trigger Values for Freshwater (Protection of 95% of Species) [A]					-	-	-	-	-	1.9	-	-	-	0.9 (pH 8)	-	0.7	-	-	-	-	-	-	-	-	6.5 - 8.5	2200	-	-	-	
GILs -Trigger Values for Marine Water (Protection of 95% of Species) [A]					-	-	-	-	-	-	-	-	-	0.91 (pH 8)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Australian Drinking Water Guidelines (2018)[C]				Health	-	-	-	-	-	0.5	-	-	1.5	-	3	50	-	-	-	-	-	-	-	-	6.5 - 8.5	-	-	-	-	
				Aesthetic	250	-	-	180	-	0.1	0.3	0.3	-	0.5	-	-	-	-	-	250	-	-	-	5	6.5 - 8.5	-	-	-	-	
Lab Report No.	Sample No.	Sample type	EPA No,	Date Sampled	Chloride	Calcium	Magnesium	Sodium	Potassium	Manganese	Total Iron	Dissolved Iron	Fluoride	Ammonia as N	Nitrite as N	Nitrate as N	Total Organic Carbon	Bicarbonate Alkalinity as CaCO3	Total Alkalinity as CaCO3	Sulfate as SO4 - Turbidimetric	Dissolved Oxygen	Dissolved Oxygen - % Saturation	Suspended Solids (SS)	Turbidity	pH	Electrical Conductivity (Non Compensated)	Temperature	Standing Water Level	Total Insoluble Matter	Comments
				Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	mg/L	NTU	pH	µS/cm	°C	mbgl	mbgl	
				Laboratory PQL	1	1	1	1	1	0.001	0.05	0.05	0.1	0.01	0.01	0.01	1	1	1	1	0.01	0.1	5	0.1	0.01	1	0.1	0.01	0.1	-
EW2305322001	BH1c	Groundwater	3	Dec 2023	994	125			220	0.11		12.00	0.3	348.00	0.01	< 0.01	153	2,780	2,780	< 20					7.00	7,840	25.0	3.19		-
EW2305322002	BH3	Groundwater	5	Dec 2023	118	146			26	0.09		1.39	< 0.1	9.99	0.24	14.00	11	358	358	120					7.10	1,110	18.0	3.12		-
EW2305322003	BH4	Groundwater	6	Dec 2023	64	125			22	0.12		3.15	< 0.1	2.42	0.01	0.36	11	367	367	103					7.30	894	18.4	4.25		-
EW2305322004	BH9	Groundwater	18	Dec 2023	387	186			83	0.85		0.12	0.4	173.00	< 0.01	< 0.01	100	1,800	1,800	< 20					7.20	3,620	18.3	3.19		-
EW2305322005	BH12r	Groundwater	17	Dec 2023	200	181			28	0.45		10.20	0.2	4.08	0.02	0.60	24	523	523	157					6.90	1,580	20.6	4.30		-
EW2305322006	BH13	Groundwater	10	Dec 2023	335	211			28	0.47		2.19	0.2	8.09	0.01	0.86	40	897	897	55					6.80	2,250	21.3	4.22		-
EW2305322007	BH14	Groundwater	11	Dec 2023	62	139			16	0.18		0.65	0.4	1.84	< 0.01	0.08	17	550	550	24					6.80	1,080	21.0	4.62		-
EW2305322008	BH15	Groundwater	7	Dec 2023	408	112			130	0.24		8.19	0.2	6.35	0.02	< 0.01	34	486	486	300					7.00	2,120	17.4	21.20		-
EW2305322010	BH18	Groundwater	25	Dec 2023	11	62			8	0.29		2.46	0.2	1.58	< 0.01	< 0.01	14	273	273	< 1					6.60	459	19.1	2.19		-
EW2305322009	BH19r	Groundwater	16	Dec 2023	34	89			42	0.06		0.74	0.1	2.42	< 0.01	< 0.01	13	329	329	42					7.50	678	18.2	4.54		-
EW2305322011	BH21	Groundwater	23	Dec 2023	238	237			41	0.12		< 0.05	0.2	0.07	0.78	52.30	27	528	528	227					6.90	2,170	21.0	3.00		-
EW2305322012	BH22	Groundwater	24	Dec 2023	77	156			13	0.34		44.60	0.4	4.68	< 0.01	0.06	33	335	335	345					6.80	1,360	18.3	2.32		-
EW2305324001	SWP1	Surfacewater	1	Dec 2023	67	32	12	59	10	0.36	0.37	0.11	0.3	0.05	< 0.01	0.01	18	162	162	15	3.81		12	4.80	7.30	526	23.8			-
EW2305324003	SWC_up	Surfacewater	20	Dec 2023	1,230	52	77	617	26	0.07	1.09	0.12	0.3	0.20	< 0.01	0.03	11	120	120	162	6.44		10	10.00	7.20	3,980	21.5			-
EW2305324002	SWC_2	Surfacewater	19	Dec 2023	1,370	60	93	749	32	0.08	1.23	0.12	0.3	0.25	< 0.01	0.08	10	120	120	186	5.24		7	10.30	7.20	4,520	21.3			-
EW2305324004	SWC_down	Surfacewater	21	Dec 2023	1,480	66	106	864	37	0.08	1.48	0.09	0.4	0.27	< 0.01	0.09	10	121	121	213	6.60		6	10.30	7.20	5,220	22.0			-
EW2305324005	SWC_down_2	Surfacewater	22	Dec 2023	1,470	64	106	858	36	0.08	1.17	0.09	0.4	0.25	< 0.01	0.07	10	120	120	195	5.81		7	10.50	7.20	5,110	21.8			-
EW2305326001	Leachate Storage Tank LP1	Leachate	2	Dec 2023	1,570	51			355	1.35	5.08		0.3	330	5.76	< 0.20	142	1,770	1,900	< 10	3.40	41.3			8.60	8,410	24.4			-

TABLE 14-2: Ammonia Results
December 2023 Quarter 1: Dunmore Recycling and Waste Depc

Ammonia Results comapred against the pH Modified Trigger Values - ANZACC (2000) Table 8.3.7				pH	Assessment Criteria		Result
				pH (lab)	pH Modifed Trigger Values - 95% Freshwater	pH Modifed Trigger Values - 95% Marine Water	Ammonai As N
			Total Concentrations - PQL	0.1	-	-	0.01
Lab Report No.		Sample ID.	Date	pH	mg/L	mg/L	mg/L
2.38	Groundwater	BH1c	4/12/2023	7.00	2.18	3.91	**348.00**
2.33		BH3	4/12/2023	7.10	2.09	3.56	**9.99**
2.26		BH4	4/12/2023	7.30	2.49	5.47	**2.42**
2.18		BH9	4/12/2023	7.20	1.99	3.20	**173.00**
2.09		BH12r	4/12/2023	6.90	2.26	4.24	**4.08**
1.99		BH13	4/12/2023	6.80	2.33	4.55	**8.09**
1.88		BH14	4/12/2023	6.80	2.33	4.55	**1.84**
1.75		BH15	4/12/2023	7.00	2.18	3.91	**6.35**
1.61		BH18	4/12/2023	6.60	2.43	5.07	**1.58**
1.47		BH19r	4/12/2023	7.50	1.61	2.15	**2.42**
1.18		BH21	4/12/2023	6.90	2.26	4.24	**0.07**
1.03		BH22	4/12/2023	6.80	2.33	4.55	**4.68**
0.9	Rocklow Creek Surface Water	SWP1	5/12/2023	7.70	1.18	1.32	**0.09**
0.78		SWC_up	5/12/2023	7.20	1.99	3.20	**0.54**
0.66		SWC_2	5/12/2023	7.30	1.88	2.84	**0.76**
0.56		SWC_down	5/12/2023	7.40	1.75	2.49	**0.51**
0.48		SWC_down_2	5/12/2023	7.40	1.75	2.49	**0.25**

TABLE 14-3: Duplicate Groundwater Sample Results and QC Data

Lab Report No.				EW2305322010	EW2305322013	RPD
Sample No.				BH18	GWDuplicate	
Sample type				Groundwater	GWQC	
EPA No,				25	QC1	
Date Sampled				1/12/2023	1/12/2023	
Analyte	Units	PQL	5 x PQL	Result	Result	
Chloride	mg/L	1	5	11	11	0.00
Calcium	mg/L	1	5	62	65	4.72
Potassium	mg/L	1	5	8	8	0.00
Manganese	mg/L	0.001	0.005	0.289	0.300	3.74
Dissolved Iron	mg/L	0.05	0.25	2.46	2.59	5.15
Fluoride	mg/L	0.1	0.5	0.20	0.20	0.00
Ammonia as N	mg/L	0.01	0.05	1.58	1.58	0.00
Nitrite as N	mg/L	0.01	0.05	< 0.01	< 0.01	0.00
Nitrate as N	mg/L	0.01	0.05	< 0.01	< 0.01	0.00
Nitrite + Nitrate as N	mg/L	0.01	0.05	< 0.01	< 0.01	0.00
Total Organic Carbon	mg/L	1	5	14	14	0.00
Bicarbonate Alkalinity as CaCO3	mg/L	1	5	273	267	2.22
Total Alkalinity as CaCO3	mg/L	1	5	273	267	2.22
Sulfate as SO4 - Turbidimetric	mg/L	1	5	< 1	< 1	0.00
pH	pH	0.01	0.05	6.60	6.60	0.00
Electrical Conductivity (Non Compensated)	µS/cm	1	5	459	461	0.43
Temperature	°C	0.1	0.5	19.1	19.1	0.00
Standing Water Level	mbgl	-		2.19	2.19	0.00

TABLE 14-4: Duplicate Surface Water Results and QC Data

Lab Report No.				EW2305324001	EW2305324006	RPD
Sample No.				SWP1	SWDuplicate	
Sample type				Surfacewater	OffSiteSWQC	
EPA No,				1	QC2	
Date Sampled				5/12/2023	5/12/2023	
Analyte	Units	PQL	5 x PQL	Result	Result	
Chloride	mg/L	1	5	67	1,290	✗ 180.25
Calcium	mg/L	1	5	32	57	✗ 56.18
Potassium	mg/L	1	5	10	30	✗ 100.00
Manganese	mg/L	0.001	0.005	0.359	0.076	✗ 130.11
Total Iron	mg/L	0.05	0.25	0.37	1.20	✗ 105.73
Dissolved Iron	mg/L	0.05	0.25	0.11	0.13	✓ 16.67
Fluoride	mg/L	0.1	0.5	0.3	0.4	✓ 28.57
Ammonia as N	mg/L	0.01	0.05	0.05	0.23	✗ 128.57
Nitrite as N	mg/L	0.01	0.05	< 0.01	< 0.01	✓ 0.00
Nitrate as N	mg/L	0.01	0.05	0.01	0.03	✗ 100.00
Nitrite + Nitrate as N	mg/L	0.01	0.05	0.01	0.03	✗ 100.00
Total Organic Carbon	mg/L	1	5	18	10	✗ 57.14
Bicarbonate Alkalinity as CaCO3	mg/L	1	5	162	122	✓ 28.17
Total Alkalinity as CaCO3	mg/L	1	5	162	122	✓ 28.17
Sulfate as SO4 - Turbidimetric	mg/L	1	5	15	189	✗ 170.59
Dissolved Oxygen	mg/L	0.01	0.05	3.81	5.23	✗ 31.42
pH	pH	0.01	0.05	7.30	7.20	✓ 1.38
Electrical Conductivity (Non Compensated)	µS/cm	1	5	526	4,520	✗ 158.30
Temperature	°C	0.1	0.5	23.8	21.3	✓ 11.09

CHARTS

APPENDICES

Appendix A:

EPL 5984 Sampling Point Summary (NSW EPA, 10/02/2022)

2	Leachate monitoring	Leachate tank labelled LP1 on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
3	Groundwater monitoring	BH1c - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
5	Groundwater monitoring	BH3 - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
6	Groundwater monitoring	BH4 - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
7	Groundwater monitoring	BH15 - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
10	Groundwater monitoring	BH13 - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
11	Groundwater monitoring	BH14 - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
16	Groundwater monitoring	BH19 - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
17	Groundwater monitoring	BH12R - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).

18	Groundwater monitoring	BH9 - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
19	Surface Water Monitoring	SWC_2 - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
20	Surface Water Monitoring	SWC_UP - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
21	Surface Water Monitoring	SWC_DOWN - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
22	Surface Water Monitoring	SWC_DOWN2 - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
23	Groundwater Monitoring	BH21 - as shown on drawing titled "Monitoring Point Location Plan - Dunmore Recycling and Waste Depot - EPL No. 5984" prepared by Cardno and attached to correspondence dated 7 April 2020 (EPA ref. no. DOC20/317779).
24	Groundwater monitoring	BH22 - as shown on drawing titled "Monitoring Point Location Plan - Dunmore Recycling and Waste Depot - EPL No. 5984" prepared by Cardno and attached to correspondence dated 7 April 2020 (EPA ref. no. DOC20/317779).
25	Groundwater monitoring	BH18 - as shown on drawing titled "Monitoring Point Location Plan - Dunmore Recycling and Waste Depot - EPL No. 5984" prepared by Cardno and attached to correspondence dated 7 April 2020 (EPA ref. no. DOC20/317779).

Appendix B:

Laboratory Chain of Custody (COC) & Certificates of Analysis (COA) – Water Samples – Quarter 1

Appendix C:

Laboratory Chain of Custody (COC) & Certificates of Analysis (COA) – Dust Samples. Quarters 1

Appendix D:

Surface Gas (Methane) Field Sheets. Quarters 1

Appendix E:
Laboratory Chain of Custody (COC) & Certificates of Analysis (COA) – Overflow Events

Appendix F:
Calibration Certificates

Appendix G:
Gas Flare Reports