

# Annual Environmental Monitoring Report (AEMR) 2022-2023

| Address:     | Dunmore Recycling & Waste Depot<br>44 Buckleys Road,<br>Dunmore, NSW, 2529 |
|--------------|--|
| Project No.: | ENRS0033   |
| Date:        | November 2023  |





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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 Annual Environmental Monitoring Report (AEMR) for the Dunmore Recycling and Waste Depot (herein referred to as the Site).

This (AEMR) summarises the results of field testing and laboratory analysis conducted by ALS for the 2022-2023 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 an Annual Environmental Monitoring Report.



The scope of work for this AEMR comprised the collation, assessment and reporting of Site data made available to ENRS from the 2022-2023 monitoring period 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 2022-2023 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 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 2022-2023 annual 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 many occasions over the 2022-2023 monitoring period. Further detail relating to root causes and current works are available in the attached Flare Reports in **Appendix J** of this report;
- 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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- Appendix J: Gas Flare Reports



## 1 Introduction

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## 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.

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## 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:

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## 1.3 Objectives

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- > 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 an Annual Environmental Monitoring Report.

## 1.4 Scope of Work

The scope of work for this AEMR comprised the collation, assessment and reporting of Site data made available to ENRS from the 2022-2023 monitoring period 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)<br>(approximate centre of Site)  | Zone 56H Easting: 302280 Northing: 6168169<br>(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<br>statutory controls   | <ul> <li>EPL 5984;</li> <li>EPL 12903;</li> <li>Contaminated Land Management Act 1997;</li> <li>Environment Protection Act 1997;</li> <li>Environment Protection Regulation 2005. Resilience and Hazards SEPP;</li> <li>Work Health and Safety Act 2011;</li> <li>Work Health and Safety Regulations 2011;</li> <li>Waste Avoidance and Resource Recovery Act (2001).</li> </ul> |
| <b>Legal permissions</b> to access the Site obtained or required                                  | N/A. ENRS did not access the Site.   |
| <b>Consent of adjoining</b><br><b>landowners</b> and/or occupiers to<br>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<br>Screening Levels | <ul> <li>ANZG (2018) (Australian and New Zealand Guidelines for Fresh<br/>and Marine Water Quality);</li> <li>ASC NEPM (2013); and</li> <li>Health Screening Levels for Petroleum Hydrocarbons in Soil &amp;<br/>Groundwater (CRC CARE, Sept. 2011)</li> </ul> |  |  |  |  |  |  |
| Drinking Water                          | <ul> <li>Australian Drinking Water Guidelines (ADWG)</li> </ul>  |  |  |  |  |  |  |

## 3.1 Groundwater & Surface water Assessment Criteria

The ANZG (2018) provide <u>default guideline values</u> (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

| Analyta                                       | Unite | Fresh              | Marine             | Drinking Water <sup>B</sup> |           |  |
|---|-------|--------------------|--------------------|-----------------------------|-----------|--|
| Analyte                                       | Units | Water <sup>A</sup> | Water <sup>A</sup> | 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 <sup>c</sup>                     | 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                                    |       | 85-110%            | -                  | -                           | -         |  |
| (surface water only)                          |       |                    |                    |                             |           |  |
| Suspended Solids (SS)<br>(surface water only) | mg/L  | -                  | -                  | -                           | -         |  |



| Analyta                 | Unite | Fresh   | Marine             | Drinking Water <sup>B</sup> |           |  |
|-------------------------|-------|---------|--------------------|-----------------------------|-----------|--|
| Analyte                 |       |         | Water <sup>A</sup> | Health                      | Aesthetic |  |
| Turbidity               | NTU   | _       | <u>_</u>           | _                           | 5         |  |
| (surface water only)    |       |         |                    |                             | U         |  |
| рН                      | рН    | 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 14-5** - **Table 14-8** 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 an Annual 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 Annual 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.

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

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

## 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 subsections 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 middepth.

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 byproduct 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**.

| 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<br>Forms | All samples logged and transferred under appropriately completed<br>Chain of Custody (COC) forms with Sample Receipts issued by the<br>laboratory. |
| Blind Field Duplicate     | At least one (1) blind field duplicate collected per 20 samples and submitted for analysis accompanied by COC forms.                               |

| Table 5-1: | Summary     | of QAQC for | Sample I    | Program |
|------------|-------------|-------------|-------------|---------|
|            | e anninan y |             | e ann pre i | regram  |

## 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 9 with comparison against the relevant Site Assessment Criteria (SAC). The laboratory certificates of analysis are provided in Appendix B.



## 6.1 Overflow Results

A total of two (2) overflow samples were taken at SWP-1 during the 2022-2023 period and are displayed in Table 6-1 below. On both occasions samples results were compliant to the EPA trigger values for pH and Suspended Solids concentrations.

#### Table 6-1: Summary of Overflow Events

| Sample Date | рН  | TSS | Ambient<br>Temperature | Rainfall (mm)<br>Previous 24Hrs |
|-------------|-----|-----|------------------------|---------------------------------|
| 13/03/2023  | 7.9 | 17  | 24.7                   | 38.2                            |
| 1/05/2023   | 7.6 | 9   | 19.5                   | Not recorded.                   |

## 6.2 **Physical Indicators**

#### 6.2.1 Groundwater Depth

The measured depth to groundwater remained relatively consistent through the monitoring period with a low degree of variance. The Site was charactered by a shallow water table of less than 5.0 mbgl. The depth to water was measured between:

- Quarter 1 December 2022: 0.73 mbgl (BH-15) and 4.53 mbgl (BH-14);
- Quarter 2 March 2023: 0.53 mbgl (BH-15) and 4.62 mbgl (BH-14);
- Quarter 3 June 2023: 0.68 mbgl (BH-15) to 4.64 mbgl (BH-14); and
- Quarter 4 September 2023: 0.89 mbgl (BH-15) and 4.53 mbgl (BH-14).

#### 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 ( $\mu$ S/cm). Table 3.3.3 of the ANZECC (2000) guidelines document default TV for EC in lowland freshwater rivers between 125  $\mu$ S/cm - 2,200  $\mu$ S/cm (~1,500 mg/L). Marine waters may be characterised by an EC between 35,000  $\mu$ S/cm - 50,000  $\mu$ S/cm.

#### Groundwater

During the annual 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 (SWP\_UP, SWC\_2, SWC\_Down and SWC-Down 2) reported elevated EC values up to 32,600  $\mu$ S/cm (SWC\_Down, June 2023), considered to be characteristic of the tidal river system. The results were generally in range of historical values and considered satisfactory.



Results for onsite surface water location SWP1 were reported between 788  $\mu$ S/cm (Sept. 2023) and 1,500  $\mu$ S/cm (Dec. 2022) which were within the adapted TV. The results were generally in range of historical data and considered satisfactory.

#### Leachate

Leachate salinity for the annual monitoring period ranged between 7,380  $\mu$ S/cm (June 2023) and 9,310  $\mu$ S/cm (Dec. 2022) which were all above the TV.

Leachate Salinity has generally stabilised since the implementation of the Leachate Treatment Plant in July/August 2021.

#### 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 reported results between 3.43mg/L / 37.72% (Dec.2022) and 8.53 mg/L / 93.8% (Mar. 2023). 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 4.16 mg/L / 45.74% (SWC-2, Mar. 2023) and to 6.71 mg/L / 74.1% (SWC-Up, June 6.742023). The results were generally consistent with the historical data.

#### Leachate

Dissolved oxygen at leachate tank LP1 ranged between 5.25 mg/L / 60.3% (Sept. 2023) and 6.22 mg/L / 60% (June 2023). 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 for the annual monitoring period for all groundwater samples were reported within the SAC. No exceedances were recorded. Groundwater was therefore measured to be generally neutral and satisfactory.

#### Surface Water

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

#### Leachate

The leachate tank LP1 generally reported alkaline conditions above the SAC. The pH of LP1 ranged between 8.5 (Dec. 2022) and 9.4 (Mar. 2023). The results were 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 generally reported below the laboratory lower limit of reporting. A maximum result of 7 mg/L (SWC\_2, June 2023) was reported. However, it was considered to be relatively minor. The results were considered satisfactory.

Results for TSS in onsite SWP1 were generally reported below the laboratory lower limit of reporting. A single detection of 99 mg/L was reported in March 2023. However, it was considered to be relatively minor. 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 annual 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 14-5 - Table 14-8) 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 reported between 0.03 mg/L (Mar. 2023) and 8.52 mg/L (Dec. 2022). Results exceeded the SAC in two (2) out of the four (4) sampling events. The results were considered to be generally consistent with previous routine monitoring samples.



Ammonia concentrations in Rocklow Creek ranged between 0.07 mg/L (SWC\_Up, 05/09/2022) to 0.76 mg/L (SWC\_2, Sept. 2023). Multiple results were report above the ecological stressor value of 0.2 mg/L. All results were below the 95% TV and pH modified TVs. Results are generally consistent with the historical data.

#### Leachate

Ammonia in leachate tank LP1 reported elevated results above the SAC between 773 mg/L (Dec. 2022) and 344 mg/L (June 2023). The results may be considered characteric 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. However, exceedances were reported above the 95% TV during each quarter. The December 2022 quarter reported exceedances in BH3 of 2.39 mg/L and BH14 of 1.59 mg/L. The March 2023 quarter reported exceedances in BH3 of 3.2 mg/L and BH21 of 9.68 mg/L. The June 2023 quarter reported exceedances in BH3 of 1.37 mg/L and BH14 of 5.95 mg/L. The September 2023 quarter reported exceedances in BH3 of 4.43 mg/L, BH14 of 1.03 mg/L and BH21 of 23.7 mg/L.

#### 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 annual monitoring period were reported below the SAC and considered satisfactory.

#### 6.3.3 Nitrite

Results for nitrate in all groundwater, surface water and leachate tank LP1 were all reported below the SAC and were considered to satisfactory.

#### 6.4 Anions

#### 6.4.1 Chloride

The results for chloride in groundwater, surface waters and leachate were reported between 13 mg/L (BH18 Sept. 2023) and 12,100 mg/L (SWC-down Jun. 2023). 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. 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 Rock low 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 for the annual monitoring period were all 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 laboratory LOR of <1.0 mg/L and 1.67 mb/L (LP1, Sept. 2023). 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 and were satisfactory.

#### 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. BH1c reported elevated results in comparison against the other sites. Results for BH1c ranged between 180mg/L (Mar. 2023) and 22 mg/L (Sept. 2023). However, the results for BH1c were within range of historical data.

TOC in surface water samples reported satisfactory results over the annual monitoring period.

TOC in leachate tank LP1 reported elevated results over the annual monitoring period. This may be expected of leachate water and 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, in general accordance with AS3580.10.1. A summary of the September 2022 results is provided in Table 7-1 below.

| Quarter     | Sample ID | Guideline<br>Criteria<br>(g/m2/month) | Total Insolvable<br>Matter<br>(g/m2/month) | Comment   |
|-------------|-----------|---------------------------------------|--|-----------|
| Quarter 1   | DDG1      |                                       | 1.2  | Below SAC |
| 4/11/2022 - | DDG2      |                                       | 0.8  | Below SAC |
| 7/12/2022   | DDG3      |                                       | 1.7  | Below SAC |
|             | DDG4      |                                       | 2.1  | Below SAC |
| Quarter 2   | DDG1      |                                       | 1.5  | Below SAC |
| 1/02/2023 - | DDG2      | 4                                     | 0.8  | Below SAC |
| 1/03/2023   | DDG3      |                                       | 1.5  | Below SAC |
|             | DDG4      |                                       | 2.4  | Below SAC |
| Quarter 3   | DDG1      |                                       | 0.6  | Below SAC |
| 4/05/2023 - | DDG2      |                                       | 0.4  | Below SAC |
| 1/06/2023   | DDG3      |                                       | 0.3  | Below SAC |

#### Table 7-1: Summary of Dust Gauge Results



| Quarter   | Sample ID | Guideline<br>Criteria<br>(g/m2/month) | Total Insolvable<br>Matter<br>(g/m2/month) | Comment   |
|-----------|-----------|---------------------------------------|--|-----------|
|           | DDG4      |                                       | 1.3  | Below SAC |
| Quarter 4 | DDG1      |                                       | 0.7  | Below SAC |
|           | DDG2      |                                       | 1.5  | Below SAC |
|           | DDG3      |                                       | 1.2  | Below SAC |
|           | DDG4      |                                       | 9.5  | Above SAC |

Results for depositional dust during the 2022-2023 annual 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 9.5 g/m2/month. Dust gauge locations are provided in Figure 2 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 2022-2023 annual 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 G**.

## 8.2 Gas Accumulation Monitoring in Enclosed Structures

The internal methane testing for enclosed structures within 250m of the landfill during the 2022-2023 annual 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 J**.

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 more often than not. This is in line with the historical data. The actions taken throughout the annual period to address the root causes are outlined in the LGI Gas Flare reports included as **Appendix G**.







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

## **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







|   | leteness | arability | sentativeness | sion   | acy   | Sta | tus      |     |   |
|---|----------|-----------|---------------|--------|-------|-----|----------|-----|---|
| QAQC Indicator  | Comp     | Comp      | Repre         | Precis | Accur | Yes | No<br>No | N/A | Procedures and performance  |
| Any information that could be<br>required to evaluate<br>measurement uncertainty for<br>subsequent testing (analysis)   |          |           |               | Х      | Х     |     |          |     | Field sampling records and chain of custody completed in full.  |
| Decontamination procedures<br>carried out between sampling<br>events  |          |           | X             | X      | x     |     |          |     | Equipment such as<br>decontaminated between<br>samples by washing with<br>phosphate free detergent<br>followed by rinsing with<br>potable water. Re-use of<br>sampling equipment was<br>avoided, where possible.<br>Single use deposable<br>sampling equipment was the<br>preferred method. |
| Logs for each sample<br>collected, including date,<br>time, location (with GPS<br>coordinates if possible),<br>sampler, duplicate samples,<br>chemical analyses to be<br>performed, site observations<br>and weather/environmental<br>(i.e. surroundings) conditions.<br>Include any diagrams, maps,<br>photos. |          | х         | x             |        |       |     |          |     | Sampling field sheets were<br>used as required.   |
| Chain of custody fully<br>identifying – for each sample<br>– the sampler, nature of the<br>sample, collection date,<br>analyses to be performed,<br>sample preservation method,<br>departure time from the site<br>and dispatch courier(s)<br>(where applicable)  | Х        | Х         |               |        |       |     |          |     | COC's completed in full.  |
| Field quality<br>assurance/quality control<br>results (e.g. field blank,<br>rinsate blank, trip blank,<br>laboratory prepared trip<br>spike)  |          |           |               | Х      | х     |     |          |     | Field QAQC analysed for<br>chemical samples – field<br>duplicate.   |





|  | eteness | arability | sentativeness | ion    | ıcy    | Sta         | itus |             |  |
|--|---------|-----------|---------------|--------|--------|-------------|------|-------------|--|
| QAQC Indicator   | Compl   | Compa     | Repres        | Precis | Accura | Yes         | No   | N/A         | Procedures and performance   |
| Sample splitting techniques –<br>subsampling,<br>containers/preservation<br>(ensure unique ID for<br>subsequent samples<br>provided)                   |         |           | Х             |        |        |             |      |             | Samples obtained in<br>laboratory prepared sample<br>containers appropriate for<br>the analytes. |
| Statement of duplicate<br>frequency  |         |           | Х             | Х      |        | $\boxtimes$ |      |             | Blind field duplicates collected at 1/20 frequency   |
| Background sample results  | Х       | Х         |               |        |        | $\boxtimes$ |      |             | Reviewed against previous investigation results.   |
| Field instrument calibrations (when used)  |         |           |               | Х      | Х      |             |      | $\boxtimes$ | Yes field equipment was calibrated prior to use.   |
| Sampling devices and equipment   | Х       | Х         |               |        |        | $\boxtimes$ |      |             | Manual sampling with decontamination procedures and disposable equipment.                        |
| A copy of signed chain-of-<br>custody forms acknowledging<br>receipt date, time and<br>temperature and identity of<br>samples included in<br>shipments | Х       | Х         |               |        |        |             |      |             | COC's completed in full,<br>final records from NATA<br>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: | Laborator | y QAQC | procedures |
|-------------|-----------|--------|------------|
|-------------|-----------|--------|------------|

|   | es        | ility     | ativ      |           |          | Stat | tus |     |   |
|---|-----------|-----------|-----------|-----------|----------|------|-----|-----|---|
| QAQC Indicator  | Completen | Comparabi | Represent | Precision | Accuracy | Yes  | No  | N/A | Procedures and performance  |
| A copy of signed chain-of-<br>custody forms acknowledging<br>receipt date, time and<br>temperature and identity of<br>samples included in shipments | Х         | Х         |           |           |          |      |     |     | All samples were<br>logged and transferred<br>under appropriately<br>completed Chain of<br>Custody Forms. |



|  | etenes | arability | sentativ | ion    | acy    | Status      |          |     |   |
|--|--------|-----------|----------|--------|--------|-------------|----------|-----|---|
| QAQC Indicator   | Compl  | Comp      | Repres   | Precis | Accura | Yes         | No<br>No | N/A | Procedures and performance  |
| Record of holding times and a<br>comparison with method<br>specifications  | Х      | Х         |          |        |        |             |          |     | Records documented<br>in the laboratory QAQC<br>report attached to CoA. |
| Analytical methods used, including any deviations  | Х      | Х         |          |        |        | $\boxtimes$ |          |     | Recorded in the CoA.  |
| Laboratory accreditation for<br>analytical methods used, also<br>noting any methods used<br>which are not covered by<br>accreditation  | X      |           |          | Х      |        |             |          |     | Recorded in the CoA.  |
| Laboratory performance for the<br>analytical method using inter-<br>laboratory duplicates  |        | Х         |          |        | Х      | $\square$   |          |     | Records documented<br>in the laboratory QAQC<br>report attached to CoA. |
| Surrogates and spikes used<br>throughout the full method<br>process, or only in parts.<br>Results are corrected for the<br>recovery  | Х      | Х         |          |        |        |             |          |     | Records documented<br>in the laboratory QAQC<br>report attached to CoA. |
| A list of what spikes and<br>surrogates were run with their<br>recoveries and acceptance<br>criteria (tabulate)  |        | х         |          |        | Х      |             |          |     | Records documented<br>in the laboratory QAQC<br>report attached to CoA. |
| Practical quantification limits (PQL)  | Х      | Х         |          |        |        | $\boxtimes$ |          |     | Recorded in the CoA.<br>PQLs <sac.< td=""></sac.<>                      |
| Reference laboratory control sample (LCS) and check results  | Х      |           |          |        |        | $\boxtimes$ |          |     | Records documented<br>in the laboratory QAQC<br>report attached to CoA. |
| Laboratory duplicate results (tabulate)  | Х      |           |          |        | Х      | $\boxtimes$ |          |     | Records documented<br>in the laboratory QAQC<br>report attached to CoA. |
| Laboratory blank results (tabulate)  | Х      |           |          |        | Х      | $\boxtimes$ |          |     | Records documented<br>in the laboratory QAQC<br>report attached to CoA. |
| Results are within control chart limits  | Х      |           |          |        |        |             |          |     | Records documented<br>in the laboratory QAQC<br>report attached to CoA. |
| Evaluation of all quality<br>assurance/control information<br>listed above against the stated<br>data quality objectives,<br>including a quality<br>assurance/control data<br>evaluation | X      | Х         | Х        | Х      | X      |             |          |     | Records documented<br>in the laboratory QAQC<br>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<br>completeness                         | <ul> <li>Completion of field records;</li> <li>Chain of Custody (COC) documentation;</li> <li>Calibration certificates for equipment;</li> <li>NATA Laboratory Sample Receipt Notification (SRN); and</li> <li>NATA laboratory Certificate of Analysis (COA).</li> <li>Sample Location Plans.</li> <li>Sample field sheets.</li> </ul> | ✓      |
| Precision &<br>accuracy for<br>sampling &<br>analysis | <ul> <li>Use only trained and qualified field personnel;</li> <li>Calibration certificates for field equipment;</li> <li>Appropriate sampling and field techniques;</li> <li>Decontamination procedures;</li> <li>Achieve laboratory QC criteria; and</li> <li>Achieve QAQC requirements for RPDs and Recovery</li> </ul>              | ✓      |
| Identify<br>Anomalies                                 | <ul> <li>No elevated results not expected by the CSM;</li> <li>No labelling or sample management errors;</li> <li>No laboratory analyses or reporting errors</li> </ul>  | ✓      |
| DATA<br>completeness                                  | <ul> <li>Sampling density comparison meets NSW EPA (1995) 'Sampling<br/>Design Guidelines' for or all potential contaminants of concern at<br/>all areas of environmental concern; and</li> <li>Systematic and judgemental sampling to provide sufficient data<br/>representative of all AECs.</li> </ul>                              | ✓      |
| Data<br>comparability                                 | <ul> <li>Use of appropriate techniques for the sampling, storage and transportation of sample media;</li> <li>Use of NATA certified laboratory using NEPM endorsed procedures; and</li> <li>Comparison with previous site information, if any.</li> </ul>  | *      |
| Data<br>representative<br>ness                        | <ul> <li>Adequate sampling coverage at all points listed in the EPL.</li> <li>Selection of representative samples from each sampling location; &amp;</li> <li>Analysis for PCoC.</li> <li>Achieve laboratory QC criteria.</li> <li>Achieve QAQC requirements for RPDs and Recovery.</li> </ul>   | V      |

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 F** 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 14-10** - **Table 14-16**. RPD results generally reported satisfactory differences within the criteria of 30% for organics and 50% for inorganics. Emissions of further 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 Annual Environmental Assessment

#### 11.1 Monitoring Point Summary

Field measurements and NATA laboratory results for dust and methane results from the annual 2023-2023 monitoring period reported satisfactory results. Water results including leachate, groundwater, onsite and offsite surface water reported concentrations of analytes within the range historical values. Water results from the last four (4) years have been tabulated and presented Charts 2-60 attached.

Groundwater monitoring wells continued to report elevated concentrations of key analytical indicators of leachate, most specifically ammonia. Concentration of ammonia in groundwater were reported in excess of the adopted site assessment criteria. Ammonia concentrations in offsite Rocklow Creek were reported below the 95% species protection trigger value. However, sampled water within Rocklow Creek contained levels of ammonia above the ecological stressor value 0.2mg/L.

The leachate tank also contained high concentrations of ammonia which is generally characterise of leachate.

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

Dust gauges across the Site largely reported satisfactory results over the 2022-2023 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 annual 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 2022-2023 monitoring results indicate no significant change in environmental conditions at the Site over the past three (3) years but did indicate. 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 2022-2023 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 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 2022-2023 annual 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 many occasions over the 2022-2023 monitoring period. Further detail relating to root causes and current works are available in the attached Flare Reports in **Appendix J** of this report;
- 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.

This report has been prepared on behalf of and for the exclusive use of the Client, and is subject to and issued in connection with the provisions of the agreement between ENRS and the Client. ENRS accepts no liability or responsibility whatsoever and expressly disclaims any responsibility for or in respect of any use of or reliance upon this report by any third party or parties.

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**

ENRS0033\_SCC Dunmore Landfill\_AEMR 2022-2023





| ENRS                                     | Client:   | Shellharbour City Council       | Drawn:  | PL      | Figure: | 3           |
|--|-----------|---------------------------------|---------|---------|---------|-------------|
| Environment & Natural Resource Solutions | Project:  | ENRS0033                        | Source: | SixMaps | Date:   | 16/01/2020  |
| 100 James Dead Charleston Handa NSW 2525 | Location: | Dunmore Recycling & Waste Depot | Scale:  | NA      | Title:  | Surface Gas |
| Tel: 02 4448 5490 Fax: 02 90374708       |           | 44 Buckleys Rd. Dunmore, NSW.   | Status: | Rev 1   |         | Sample      |
| projects@enrs.com.au www.enrs.com.au     |           | 2529                            |         |         |         | transects   |



# TABLES



|                            |                                |                                |         |                |           |           |           | Q         | uarterly V | T<br>Vater Mo | <b>ABLE</b>  | E 14-1:<br>g Result | <b>Tota</b><br>is - Dece | I Conc<br>ember 20 | entra<br>22: Dun | tion R       | esults<br>ecycling   | S<br>and Wa                         | ste Depot                 | t                                 |                  |                                    |                       |           |            |  |             |                      |                        |          |
|----------------------------|--------------------------------|--------------------------------|---------|----------------|-----------|-----------|-----------|-----------|------------|---------------|--------------|---------------------|--------------------------|--------------------|------------------|--------------|----------------------|-------------------------------------|---------------------------|-----------------------------------|------------------|------------------------------------|-----------------------|-----------|------------|--|-------------|----------------------|------------------------|----------|
| GILs -Trigger Values for F | reshwater (Protection of 9     | 5% of Species) <sup>A</sup>    |         |                | -         | -         | -         | -         | -          | 1.9           | -            | -                   | -                        | 0.9 (pH 8)         | ) -              | 0.7          | -                    | -                                   | -                         | -                                 | -                | -                                  | -                     | -         | 6.5 - 8.5  | 2200   | -           | -                    | -                      |          |
| GILs -Trigger Values for M | farine Water (Protection of    | f 95% of Species) <sup>A</sup> |         |                | -         | -         | -         | -         | -          | -             | -            | -                   | -                        | 0.91 (pH<br>8)     | -                | -            |                      | -                                   | -                         | -                                 | -                | -                                  | -                     | -         | -          | -  | -           | -                    | -                      |          |
| Australian Drinking Water  | Guidelines (2018) <sup>C</sup> |                                |         | Health         | -         | -         | -         | -         | -          | 0.5           | -            |                     | 1.5                      | -                  | 3                | 50           | -                    | -                                   |                           | -                                 | -                | -                                  | -                     | -         | 6.5 - 8.5  | -  | -           | -                    | -                      |          |
|                            |                                |                                | T       | 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 | Bicar bonate Alkalinity as<br>CaCO3 | Total Alkalinity as CaCO3 | Suffate as SO4 -<br>Turbidimetric | Dissolved Oxygen | Dissolved Oxygen - %<br>Saturation | Suspended Solids (SS) | Turbidity | Æ          | Electrical Conductivity<br>(Non Compensated) | Temperature | Standing Water Level | Total Insoluble Matter | Comments |
|                            | 1                              |                                |         | Laboratory PQL | mg/L<br>1 | mg/L<br>1 | mg/L<br>1 | mg/L<br>1 | mg/L<br>1  | mg/L<br>0.001 | mg/L<br>0.05 | mg/L<br>0.05        | mg/L<br>0.1              | mg/L<br>0.01       | mg/L<br>0.01     | mg/L<br>0.01 | mg/L<br>1            | mg/L<br>1                           | mg/L<br>1                 | mg/L<br>1                         | mg/L<br>0.01     | %<br>0.1                           | mg/L<br>5             | 0.1       | рН<br>0.01 | μS/cm<br>1                                   | °C<br>0.1   | mbgl<br>0.01         | mbgl<br>0.1            |          |
| EW2205534001               | BH1c                           | Groundwater                    | 3       | Dec 2022       | 904       | 133       |           |           | 219        | 0.11          |              | 8.16                | 0.5                      | 345.00             | < 0.01           | < 0.01       | 203                  | 2,780                               | 2,780                     | < 10                              |                  |                                    |                       |           | 7.00       | 7,160  | 25.2        | 3.00                 |                        | -        |
| EW2205534002               | BH3                            | Groundwater                    | 5       | Dec 2022       | 140       | 126       |           |           | 44         | 0.02          |              | < 0.05              | 0.2                      | 8.51               | 0.27             | 2.39         | 17                   | 330                                 | 330                       | 158                               |                  |                                    |                       |           | 8.10       | 1,160  | 17.6        | 3.01                 |                        | -        |
| EW2205534003               | BH4                            | Groundwater                    | 6       | Dec 2022       | 50        | 86        |           |           | 16         | 0.09          |              | 1.70                | 0.1                      | 1.62               | 0.01             | 0.01         | 14                   | 297                                 | 297                       | 61                                |                  |                                    |                       |           | 8.20       | 692  | 17.6        | 4.24                 |                        | -        |
| EW2205534004               | BH9                            | Groundwater                    | 18      | Dec 2022       | 392       | 180       |           |           | 69         | 0.68          |              | 0.32                | 0.4                      | 124.00             | < 0.01           | < 0.01       | 79                   | 1,820                               | 1,820                     | < 10                              |                  |                                    |                       |           | 7.30       | 3,580  | 18.7        | 2.94                 |                        | -        |
| EW2205534005               | BH12r                          | Groundwater                    | 17      | Dec 2022       | 107       | 154       |           |           | 28         | 0.51          |              | 6.52                | 0.2                      | 3.74               | < 0.01           | 0.01         | 21                   | 568                                 | 568                       | 119                               |                  |                                    |                       |           | 7.30       | 1,340  | 19.4        | 4.15                 |                        | -        |
| EW2205534006               | BH13                           | Groundwater                    | 10      | Dec 2022       | 204       | 185       |           |           | 17         | 0.32          |              | 1.82                | 0.2                      | 3.32               | 0.03             | 0.19         | 23                   | 779                                 | 779                       | 64                                |                  |                                    |                       |           | 7.30       | 1,770  | 20.3        | 4.11                 |                        | -        |
| EW2205534007               | BH14                           | Groundwater                    | 11      | Dec 2022       | 33        | 82        |           |           | 14         | 0.08          |              | 0.07                | 0.6                      | 0.93               | 0.01             | 1.57         | 18                   | 334                                 | 334                       | 80                                |                  |                                    |                       |           | 7.00       | 756  | 19.7        | 4.53                 |                        | -        |
| EW2205534008               | BH15                           | Groundwater                    | 7       | Dec 2022       | 447       | 131       |           |           | 185        | 0.31          |              | 10.20               | 0.2                      | 10.30              | < 0.01           | 0.14         | 37                   | 467                                 | 467                       | 534                               |                  |                                    |                       |           | 7.40       | 2,650  | 18.2        | 0.73                 |                        | -        |
| EW2205534010               | BH18                           | Groundwater                    | 25      | Dec 2022       | 76        | 87        |           |           | 18         | 0.08          |              | 1.85                | 0.2                      | 1.51               | < 0.01           | < 0.01       | 22                   | 458                                 | 458                       | 12                                |                  |                                    |                       |           | 7.20       | 880  | 18.3        | 1.97                 |                        | -        |
| EW2205534009               | BH19r                          | Groundwater                    | 16      | Dec 2022       | 52        | 75        |           |           | 37         | 0.07          |              | 0.97                | 0.2                      | 2.35               | 0.01             | < 0.01       | 19                   | 287                                 | 287                       | 53                                |                  |                                    |                       |           | 8.40       | 724  | 17.6        | 4.53                 |                        | -        |
| EW2205534011               | BH21                           | Groundwater                    | 23      | Dec 2022       | 429       | 131       |           |           | 18         | 0.56          |              | 0.13                | 0.4                      | 4.92               | < 0.01           | < 0.01       | 41                   | 834                                 | 834                       | 149                               |                  |                                    |                       |           | 7.30       | 2,560  | 20.9        | 2.98                 |                        | -        |
| EW2205534012               | BH22                           | Groundwater                    | 24      | Dec 2022       | 235       | 94        |           |           | 43         | 0.02          |              | 0.12                | 0.4                      | 55.80              | < 0.01           | 0.01         | 34                   | 606                                 | 606                       | 283                               |                  |                                    |                       |           | 8.10       | 1,910  | 17.3        | 2.77                 |                        | -        |
| EW2205529001               | SWP1                           | Surfacewater                   | 1       | Dec 2022       | 225       | 65        | 41        | 213       | 20         | 0.84          | 0.14         | 0.06                | 0.4                      | 8.52               | 0.04             | 0.02         | 30                   | 464                                 | 464                       | 96                                | 3.43             |                                    | 14                    | 2.70      | 7.50       | 1,500  | 19.5        |                      |                        | -        |
| EW2205529003               | SWC_up                         | Surfacewater                   | 20      | Dec 2022       | 6,620     | 145       | 378       | 3,280     | 122        | 0.17          | 0.89         | < 0.05              | 0.6                      | 0.32               | < 0.01           | 0.10         | 8                    | 150                                 | 150                       | 817                               | 4.94             |                                    | < 5                   | 14.00     | 7.00       | 17,100                                       | 19.0        |                      |                        | -        |
| EW2205529002               | SWC_2                          | Surfacewater                   | 19      | Dec 2022       | 5,380     | 124       | 308       | 2,680     | 101        | 0.17          | 1.20         | < 0.05              | 0.6                      | 0.53               | 0.01             | 0.11         | 9                    | 141                                 | 141                       | 680                               | 5.80             |                                    | 10                    | 19.70     | 7.00       | 14,100                                       | 18.7        |                      |                        | -        |
| EW2205529004               | SWC_down                       | Surfacewater                   | 21      | Dec 2022       | 8,410     | 184       | 493       | 4,310     | 160        | 0.13          | 0.68         | < 0.05              | 0.7                      | 0.58               | < 0.01           | 0.07         | 9                    | 154                                 | 154                       | 1,060                             | 7.07             |                                    | < 5                   | 10.70     | 7.00       | 21,600                                       | 19.0        |                      |                        | -        |
| EW2205529005               | SWC_down_2                     | Surfacewater                   | 22      | Dec 2022       | 11,200    | 242       | 678       | 5,920     | 216        | 0.11          | 0.48         | < 0.05              | 0.8                      | 0.32               | < 0.01           | 0.04         | 7                    | 142                                 | 142                       | 1,500                             | 4.49             |                                    | < 5                   | 6.30      | 7.00       | 29,100                                       | 18.7        |                      |                        | -        |
| EW2205533001               | Leachate Storage Tank<br>LP1   | Leachate                       | 2       | Dec 2022       | 1,710     | 39        |           |           | 363        | 0.10          | 1.35         |                     | 0.2                      | 773.00             | < 1.00           | < 1.00       | 506                  | 2,600                               | 3,600                     | < 100                             | 5.58             | 63.2                               |                       |           | 8.50       | 9,310  | 19.9        |                      |                        | -        |
|                            |                                |                                |         |                |           |           |           |           |            |               |              |                     |                          |                    |                  |              |                      |                                     |                           |                                   |                  |                                    |                       |           |            |  |             |                      |                        |          |



|                            |                                |                                 |         |                |           |         |           |        | Quarterly | T<br>Water M | ABLE<br>Monitori | 1 <b>4-2:</b><br>ing Resu | Tota<br>ults - Ma | I Conc<br>rch 2023 | entra<br>: Dunm | tion R<br>ore Recy | esults<br>ycling ar  | nd Waste                           | e Depot                   |                                   |                  |                                    |                       |           |            |  |             |                      |                        |          |
|----------------------------|--------------------------------|---------------------------------|---------|----------------|-----------|---------|-----------|--------|-----------|--------------|------------------|---------------------------|-------------------|--------------------|-----------------|--------------------|----------------------|------------------------------------|---------------------------|-----------------------------------|------------------|------------------------------------|-----------------------|-----------|------------|--|-------------|----------------------|------------------------|----------|
| GILs -Trigger Values for F | reshwater (Protection of 9     | 95% of Species) <sup>A</sup>    |         |                | -         | -       | -         | -      | -         | 1.9          | -                | -                         | -                 | 0.9 (pH 8)         | -               | 0.7                | -                    | -                                  | -                         | -                                 | -                | -                                  | -                     | -         | 6.5 - 8.5  | 2200   | -           | -                    | -                      |          |
| GILs -Trigger Values for N | Marine Water (Protection o     | of 95% of Species) <sup>A</sup> |         | _              | -         | -       | -         | -      |           |              | -                | -                         | -                 | 0.91 (pH<br>8)     | -               | -                  | -                    | -                                  | -                         | -                                 | -                | -                                  | -                     | -         | -          | -  | -           | •                    | -                      |          |
| Australian Drinking Water  | Guidelines (2018) <sup>C</sup> |                                 |         | Health         | -         |         | -         | -      | -         | 0.5          |                  | -                         | 1.5               | -                  | 3               | 50                 | -                    | -                                  | -                         |                                   | -                | -                                  | -                     | -         | 6.5 - 8.5  | -  | -           | -                    | •                      |          |
|                            | Ĩ                              |                                 | T       | 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<br>CaCO3 | Total Alkalinity as CaCO3 | Sulfate as SO4 -<br>Turbidimetric | Dissolved Oxygen | Dissolved Oxygen - %<br>Saturation | Suspended Solids (SS) | Turbidity | H          | Electrical Conductivity<br>(Non Compensated) | Temperature | Standing Water Level | Total Insoluble Matter | Comments |
|                            | 1                              | [                               | 1       | Laboratory PQL | mg/∟<br>1 | 1<br>1  | 1         | 1<br>1 | mg/∟<br>1 | 0.001        | 0.05             | 0.05                      | mg/L<br>0.1       | 0.01               | 0.01            | 0.01               | mg/L<br>1            | mg/L<br>1                          | mg/∟<br>1                 | 1<br>1                            | 0.01             | %<br>0.1                           | mg/∟<br>5             | 0.1       | рн<br>0.01 | μ5/cm<br>1                                   | 0.1         | 0.01                 | 0.1                    |          |
| EW2300850001               | BH1c                           | Groundwater                     | 3       | Mar 2023       | 1,060     | 148     |           |        | 240       | 0.11         |                  | 12.40                     | 0.4               | 285.00             | < 0.01          | < 0.01             | 180                  | 2,650                              | 2,650                     | < 10                              |                  |                                    |                       |           | 7.10       | 7,960  | 24.8        | 3.02                 |                        | -        |
| EW2300850002               | ВНЗ                            | Groundwater                     | 5       | Mar 2023       | 140       | 134     |           |        | 36        | 0.07         |                  | 0.18                      | 0.2               | 10.60              | 0.14            | 3.20               | 17                   | 318                                | 318                       | 143                               |                  |                                    |                       |           | 7.30       | 1,230  | 18.5        | 3.10                 |                        | -        |
| EW2300850003               | BH4                            | Groundwater                     | 6       | Mar 2023       | 51        | 92      |           |        | 16        | 0.10         |                  | 2.19                      | 0.1               | 2.00               | 0.01            | < 0.01             | 11                   | 261                                | 261                       | 51                                |                  |                                    |                       |           | 7.40       | 688  | 18.3        | 4.32                 |                        | -        |
| EW2300850004               | ВН9                            | Groundwater                     | 18      | Mar 2023       | 382       | 183     |           |        | 88        | 0.66         |                  | 0.81                      | 0.4               | 122.00             | < 0.01          | 0.02               | 64                   | 1,760                              | 1,760                     | < 10                              |                  |                                    |                       |           | 7.20       | 3,690  | 18.8        | 3.09                 |                        | -        |
| EW2300850005               | BH12r                          | Groundwater                     | 17      | Mar 2023       | 174       | 207     |           |        | 28        | 0.55         |                  | 9.67                      | 0.2               | 4.24               | < 0.01          | < 0.01             | 20                   | 619                                | 619                       | 208                               |                  |                                    |                       |           | 6.80       | 1,670  | 19.7        | 4.23                 |                        | -        |
| EW2300850006               | BH13                           | Groundwater                     | 10      | Mar 2023       | 245       | 206     |           |        | 21        | 0.42         |                  | 3.45                      | 0.2               | 5.31               | < 0.01          | < 0.01             | 28                   | 744                                | 744                       | 58                                |                  |                                    |                       |           | 6.90       | 1,930  | 20.7        | 4.19                 |                        | -        |
| EW2300850007               | BH14                           | Groundwater                     | 11      | Mar 2023       | 30        | 96      |           |        | 14        | 0.11         |                  | 0.55                      | 0.6               | 1.18               | < 0.01          | < 0.01             | 13                   | 359                                | 359                       | 73                                |                  |                                    |                       |           | 7.00       | 762  | 20.0        | 4.62                 |                        | -        |
| EW2300850008               | BH15                           | Groundwater                     | 7       | Mar 2023       | 476       | 137     |           |        | 174       | 0.27         |                  | 9.33                      | 0.2               | 8.12               | 0.03            | 0.17               | 34                   | 471                                | 471                       | 366                               |                  |                                    |                       |           | 6.80       | 2,570  | 18.5        | 0.53                 |                        | -        |
| EW2300850010               | BH18                           | Groundwater                     | 25      | Mar 2023       | 31        | 80      |           |        | 11        | 0.14         |                  | 2.02                      | 0.2               | 1.02               | < 0.01          | < 0.01             | 14                   | 272                                | 272                       | < 10                              |                  |                                    |                       |           | 6.80       | 601  | 20.8        | 2.10                 |                        | -        |
| EW2300850009               | BH19r                          | Groundwater                     | 16      | Mar 2023       | 29        | 73      |           |        | 41        | 0.06         |                  | 0.89                      | 0.2               | 2.28               | 0.02            | < 0.01             | 6                    | 339                                | 339                       | 26                                |                  |                                    |                       |           | 7.50       | 638  | 18.3        | 4.52                 |                        | -        |
| EW2300850011               | BH21                           | Groundwater                     | 23      | Mar 2023       | 339       | 169     |           |        | 23        | 0.51         |                  | 0.26                      | 0.4               | 2.64               | 0.32            | 9.68               | 33                   | 851                                | 851                       | 145                               |                  |                                    |                       |           | 7.20       | 2,480  | 21.7        | 2.97                 |                        | -        |
| EW2300850012               | BH22                           | Groundwater                     | 24      | Mar 2023       | 240       | 113     |           |        | 39        | 0.04         |                  | 0.06                      | 0.4               | 35.00              | < 0.01          | < 0.01             | 29                   | 651                                | 651                       | 223                               |                  |                                    |                       |           | 7.50       | 2,250  | 18.5        | 2.60                 |                        | -        |
| EW2300849001               | SWP1                           | Surfacewater                    | 1       | Mar 2023       | 147       | 67      | 33        | 161    | 13        | 0.57         | 1.45             | 0.20                      | 0.3               | 0.03               | < 0.01          | < 0.01             | 24                   | 397                                | 397                       | 53                                | 8.53             |                                    | 99                    | 40.00     | 7.50       | 1,210  | 21.9        |                      |                        | -        |
| EW2300849003               | SWC_up                         | Surfacewater                    | 20      | Mar 2023       | 8,150     | 180     | 552       | 4,750  | 173       | 0.20         | 0.61             | 0.10                      | 0.7               | 0.07               | < 0.01          | 0.02               | 7                    | 138                                | 138                       | 913                               | 4.79             |                                    | < 5                   | 3.20      | 7.10       | 24,200                                       | 22.3        |                      |                        | -        |
| EW2300849002               | SWC_2                          | Surfacewater                    | 19      | Mar 2023       | 9,180     | 201     | 633       | 5,460  | 194       | 0.18         | 0.46             | 0.08                      | 0.8               | 0.19               | 0.01            | < 0.01             | 7                    | 114                                | 114                       | 1,390                             | 4.16             |                                    | < 5                   | 2.20      | 7.30       | 27,500                                       | 22.9        |                      |                        | -        |
| EW2300849004               | SWC_down                       | Surfacewater                    | 21      | Mar 2023       | 7,720     | 170     | 522       | 4,510  | 163       | 0.22         | 0.59             | 0.05                      | 0.8               | 0.25               | 0.01            | 0.01               | 7                    | 131                                | 131                       | 886                               | 4.92             |                                    | < 5                   | 2.90      | 7.20       | 23,800                                       | 23.8        |                      |                        | -        |
| EW2300849005               | SWC_down_2                     | Surfacewater                    | 22      | Mar 2023       | 7,640     | 170     | 513       | 4,340  | 159       | 0.22         | 0.58             | < 0.05                    | 0.7               | 0.12               | 0.01            | 0.01               | < 1                  | 127                                | 127                       | 835                               | 5.26             |                                    | < 5                   | 2.90      | 7.30       | 23,300                                       | 23.7        |                      |                        | -        |
| EW2300847001               | Leachate Storage Tank<br>LP1   | Leachate                        | 2       | Mar 2023       | 1,460     | 37      |           |        | 393       | 0.09         | 1.24             |                           | 0.2               | 432.00             | 2.16            | < 0.10             | 373                  | 2,060                              | 3,150                     | < 20                              | 5.66             | 70.5                               |                       |           | 9.40       | 9,260  | 24.8        |                      |                        | -        |
|                            |                                |                                 |         |                |           |         |           |        |           |              |                  |                           |                   |                    |                 |                    |                      |                                    |                           |                                   |                  |                                    |                       |           |            |  |             |                      |                        |          |



|                          |                                   |                              |         |                |           |           |           |           | Quarterly | T<br>y Water  | ABLE<br>Monitor | 14-3:<br>ing Resu | <b>Tota</b> l<br>ults - Ju | l Conc<br>ne 2023: | entra<br>Dunmo | tion R<br>ore Recy | esults               | d Waste                            | Depot                     |                                   |                  |                                    |                       |            |            |  |             |                      |                        |          |
|--------------------------|-----------------------------------|------------------------------|---------|----------------|-----------|-----------|-----------|-----------|-----------|---------------|-----------------|-------------------|----------------------------|--------------------|----------------|--------------------|----------------------|------------------------------------|---------------------------|-----------------------------------|------------------|------------------------------------|-----------------------|------------|------------|--|-------------|----------------------|------------------------|----------|
| GILs -Trigger Values for | Freshwater (Protection of 9       | 5% of Species) <sup>A</sup>  |         |                | -         | -         | -         | -         | -         | 1.9           | -               | -                 | -                          | 0.9 (pH 8)         | -              | 0.7                | -                    | -                                  | -                         | -                                 | -                | -                                  | -                     | -          | 6.5 - 8.5  | 2200   | -           | -                    | -                      |          |
| GILs -Trigger Values for | Marine Water (Protection of       | 95% of Species) <sup>A</sup> |         |                | -         | -         | -         | -         | -         | -             | -               | -                 | -                          | 0.91 (pH<br>8)     | -              | -                  | -                    | -                                  | -                         | -                                 | -                | -                                  | -                     | -          | -          | -  | -           | -                    | -                      |          |
| Australian Drinking Wate | er Guidelines (2018) <sup>C</sup> |                              |         | 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<br>CaCO3 | Total Alkalinity as CaCO3 | Sulfate as SO4 -<br>Turbidimetric | Dissolved Oxygen | Dissolved Oxygen - %<br>Saturation | Suspended Solids (SS) | Turbidity  | Æ          | Electrical Conductivity<br>(Non Compensated) | Temperature | Standing Water Level | Total Insoluble Matter | Comments |
|                          |                                   |                              | 1       | Laboratory PQL | mg/L<br>1 | mg/L<br>1 | mg/L<br>1 | mg/L<br>1 | mg/L<br>1 | mg/L<br>0.001 | mg/L<br>0.05    | mg/L<br>0.05      | mg/L<br>0.1                | mg/L<br>0.01       | mg/L<br>0.01   | mg/L<br>0.01       | mg/L<br>1            | mg/L<br>1                          | mg/L<br>1                 | mg/L<br>1                         | mg/L<br>0.01     | %<br>0.1                           | mg/L<br>5             | NTU<br>0.1 | рН<br>0.01 | μS/cm<br>1                                   | °C<br>0.1   | mbgl<br>0.01         | mbgi<br>0.1            | -        |
| EW2302416001             | BH1c                              | Groundwater                  | 3       | Jun 2023       | 970       | 116       |           |           | 207       | 0.10          |                 | 11.60             | 0.5                        | 298.00             | < 0.01         | < 0.01             | 186                  | 2,600                              | 2,600                     | < 10                              |                  |                                    |                       |            | 7.00       | 7,945  |             | 3.09                 |                        | -        |
| EW2302416002             | внз                               | Groundwater                  | 5       | Jun 2023       | 123       | 101       |           |           | 31        | 0.08          |                 | 0.27              | 0.2                        | 12.30              | 0.13           | 1.37               | 22                   | 370                                | 370                       | 146                               |                  |                                    |                       |            | 7.50       | 1,200  | 25.9        | 3.08                 |                        | -        |
| EW2302416003             | BH4                               | Groundwater                  | 6       | Jun 2023       | 35        | 94        |           |           | 16        | 0.10          |                 | 2.59              | 0.1                        | 2.04               | < 0.01         | < 0.01             | 10                   | 310                                | 310                       | 70                                |                  |                                    |                       |            | 7.40       | 751  | 18.9        | 4.28                 |                        | -        |
| EW2302416004             | ВН9                               | Groundwater                  | 18      | Jun 2023       | 516       | 181       |           |           | 76        | 0.71          |                 | 0.89              | 0.6                        | 141.00             | < 0.01         | 0.03               | 76                   | 1,790                              | 1,790                     | 50                                |                  |                                    |                       |            | 7.20       | 4,120  | 18.0        | 3.86                 |                        | -        |
| EW2302416005             | BH12r                             | Groundwater                  | 17      | Jun 2023       | 246       | 185       |           |           | 27        | 0.53          |                 | 9.38              | 0.3                        | 3.59               | 0.07           | 0.39               | 24                   | 571                                | 571                       | 178                               |                  |                                    |                       |            | 6.80       | 1,930  | 21.1        | 4.25                 |                        | -        |
| EW2302416006             | BH13                              | Groundwater                  | 10      | Jun 2023       | 308       | 213       |           |           | 29        | 0.41          |                 | 3.40              | 0.2                        | 9.59               | 0.02           | 0.37               | 38                   | 812                                | 812                       | 67                                |                  |                                    |                       |            | 6.80       | 2,260  | 21.9        | 4.22                 |                        | -        |
| EW2302416007             | BH14                              | Groundwater                  | 11      | Jun 2023       | 36        | 106       |           |           | 12        | 0.12          |                 | 0.05              | 0.7                        | 1.40               | 0.06           | 5.94               | 12                   | 422                                | 422                       | 50                                |                  |                                    |                       |            | 6.90       | 958  | 21.1        | 4.64                 |                        | -        |
| EW2302416008             | BH15                              | Groundwater                  | 7       | Jun 2023       | 340       | 112       |           |           | 138       | 0.26          |                 | 9.12              | 0.2                        | 8.74               | < 0.01         | 0.01               | 39                   | 507                                | 507                       | 366                               |                  |                                    |                       |            | 7.00       | 2,250  | 17.1        | 0.68                 |                        | -        |
| EW2302416010             | BH18                              | Groundwater                  | 25      | Jun 2023       | 16        | 60        |           |           | 10        | 0.07          |                 | 1.31              | 0.2                        | 1.05               | < 0.01         | < 0.01             | 14                   | 267                                | 267                       | < 10                              |                  |                                    |                       |            | 6.80       | 511  | 20.7        | 2.26                 |                        | -        |
| EW2302416009             | BH19r                             | Groundwater                  | 16      | Jun 2023       | 38        | 74        |           |           | 49        | 0.06          |                 | 1.06              | 0.2                        | 1.85               | < 0.01         | < 0.01             | 14                   | 336                                | 336                       | 39                                |                  |                                    |                       |            | 7.40       | 731  | 18.9        | 4.54                 |                        | -        |
| EW2302416011             | BH21                              | Groundwater                  | 23      | Jun 2023       | 353       | 125       |           |           | 16        | 0.47          |                 | 0.76              | 0.4                        | 3.60               | < 0.01         | < 0.01             | 38                   | 854                                | 854                       | 114                               |                  |                                    |                       |            | 7.20       | 2,550  | 22.6        | 3.01                 |                        | -        |
| EW2302416012             | BH22                              | Groundwater                  | 24      | Jun 2023       | 183       | 87        |           |           | 18        | 0.07          |                 | 0.96              | 0.8                        | 4.11               | < 0.01         | < 0.01             | 26                   | 424                                | 424                       | 224                               |                  |                                    |                       |            | 7.30       | 1,580  | 19.2        | 2.40                 |                        | -        |
| EW2302415001             | SWP1                              | Surfacewater                 | 1       | Jun 2023       | 173       | 73        | 33        | 156       | 17        | 0.12          | 0.16            | < 0.05            | 0.3                        | 0.96               | 0.04           | < 0.01             | 25                   | 431                                | 431                       | 39                                | 5.90             |                                    | < 5                   | 1.40       | 7.70       | 1,080  | 13.4        |                      |                        | -        |
| EW2302415003             | SWC_up                            | Surfacewater                 | 20      | Jun 2023       | 7,090     | 180       | 465       | 3,840     | 145       | 0.07          | 0.79            | < 0.05            | 0.7                        | 0.20               | 0.02           | 0.14               | 9                    | 139                                | 139                       | 968                               | 6.71             |                                    | 5                     | 7.40       | 7.20       | 18,800                                       | 15.4        |                      |                        | -        |
| EW2302415002             | SWC_2                             | Surfacewater                 | 19      | Jun 2023       | 6,870     | 155       | 380       | 3,280     | 122       | 0.07          | 0.88            | < 0.05            | 0.6                        | 0.29               | 0.02           | 0.13               | 10                   | 141                                | 141                       | 908                               | 6.32             |                                    | 7                     | 8.00       | 7.20       | 17,400                                       | 15.0        |                      |                        | -        |
| EW2302415004             | SWC_down                          | Surfacewater                 | 21      | Jun 2023       | 12,100    | 288       | 765       | 6,440     | 244       | 0.05          | 0.34            | < 0.10            | 0.9                        | 0.69               | 0.02           | 0.05               | 7                    | 151                                | 151                       | 2,000                             | 6.05             |                                    | < 5                   | 4.00       | 7.20       | 32,600                                       | 16.9        |                      |                        | -        |
| EW2302415005             | SWC_down_2                        | Surfacewater                 | 22      | Jun 2023       | 9,680     | 229       | 592       | 5,000     | 210       | 0.06          | 0.53            | < 0.10            | 0.8                        | 0.28               | 0.02           | 0.08               | 8                    | 144                                | 144                       | 1,560                             | 6.55             |                                    | < 5                   | 5.10       | 7.30       | 25,000                                       | 15.9        |                      |                        | -        |
| EW2302414001             | Leachate Storage Tank<br>LP1      | Leachate                     | 2       | Jun 2023       | 1,810     | 39        |           |           | 375       | 0.10          | 1.29            |                   | 0.3                        | 344.00             | 6.96           | < 0.10             | 407                  | 1,840                              | 2,780                     | < 50                              | 6.22             | 60.0                               |                       |            | 9.30       | 7,380  | 13.8        |                      |                        | -        |
|                          |                                   |                              |         |                |           |           |           |           |           |               |                 |                   |                            |                    |                |                    |                      |                                    |                           |                                   |                  |                                    |                       |            |            |  |             |                      |                        |          |



|                            |                                  |                                |         |                         |           |           |           | Qı        | arterly W | T<br>/ater Mo | ABLE         | <b>14-4:</b><br>g Results | Tota<br>s - Septe | I Conc<br>ember 20 | entra<br>23: Dur | tion R       | esults<br>ecycling   | and Wa                             | ste Depo                  | t                                 |                  |                                    |                       |           |            |  |             |                      |                        |          |
|----------------------------|----------------------------------|--------------------------------|---------|-------------------------|-----------|-----------|-----------|-----------|-----------|---------------|--------------|---------------------------|-------------------|--------------------|------------------|--------------|----------------------|------------------------------------|---------------------------|-----------------------------------|------------------|------------------------------------|-----------------------|-----------|------------|--|-------------|----------------------|------------------------|----------|
| GILs -Trigger Values for F | Freshwater (Protection of 9      | 5% of Species) <sup>A</sup>    |         |                         | -         | -         | -         | -         | -         | 1.9           | -            |                           |                   | 0.9 (pH 8)         | -                | 0.7          | -                    | -                                  | -                         | -                                 | -                | -                                  | -                     | -         | 6.5 - 8.5  | 2200   | -           | -                    | -                      |          |
| GILs -Trigger Values for I | Marine Water (Protection o       | f 95% of Species) <sup>A</sup> |         |                         | -         | -         | -         | -         | -         | -             | -            | -                         | -                 | 0.91 (pH<br>8)     | -                | -            | -                    | -                                  | -                         | -                                 | -                | -                                  | -                     | -         | -          | -  | -           | -                    | -                      |          |
| Australian Drinking Water  | r Guidelines (2018) <sup>C</sup> |                                |         | Health                  | -         | -         | -         | -         | -         | 0.5           | -            |                           | 1.5               | -                  | 3                | 50           | -                    | -                                  | -                         |                                   | -                | -                                  | -                     | -         | 6.5 - 8.5  | -  | -           | -                    | -                      |          |
|                            | ľ                                |                                | T       | 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<br>CaCO3 | Total Alkalinity as CaCO3 | Suffate as SO4 -<br>Turbidimetric | Dissolved Oxygen | Dissolved Oxygen - %<br>Saturation | Suspended Solids (SS) | Turbidity | Æ          | Electrical Conductivity<br>(Non Compensated) | Temperature | Standing Water Level | Total Insoluble Matter | Comments |
|                            | 1                                |                                |         | Units<br>Laboratory PQL | mg/L<br>1 | mg/L<br>1 | mg/L<br>1 | mg/L<br>1 | mg/L<br>1 | mg/L<br>0.001 | mg/L<br>0.05 | mg/L<br>0.05              | mg/L<br>0.1       | mg/L<br>0.01       | mg/L<br>0.01     | mg/L<br>0.01 | mg/L<br>1            | mg/L<br>1                          | mg/L<br>1                 | mg/L<br>1                         | mg/L<br>0.01     | %<br>0.1                           | mg/L<br>5             | 0.1       | рН<br>0.01 | μS/cm<br>1                                   | °C<br>0.1   | mbgl<br>0.01         | mbgl<br>0.1            | -        |
| EW2303854001               | BH1c                             | Groundwater                    | 3       | Sep 2023                | 1,110     | 135       |           |           | 242       | 0.12          |              | 9.04                      | 0.4               | 314.00             | < 0.01           | < 0.10       | 222                  | 2,760                              | 2,760                     | < 10                              |                  |                                    |                       |           | 6.90       | 7,610  | 23.9        | 3.25                 |                        | -        |
| EW2303854002               | ВНЗ                              | Groundwater                    | 5       | Sep 2023                | 260       | 137       |           |           | 31        | 0.21          |              | 2.90                      | 0.1               | 29.20              | 0.03             | 0.08         | 22                   | 483                                | 483                       | 210                               |                  |                                    |                       |           | 7.30       | 1,650  | 17.8        | 3.13                 |                        | -        |
| EW2303854003               | BH4                              | Groundwater                    | 6       | Sep 2023                | 55        | 132       |           |           | 20        | 0.12          |              | 3.08                      | 0.1               | 1.68               | < 0.01           | 0.14         | 11                   | 381                                | 381                       | 115                               |                  |                                    |                       |           | 7.30       | 880  | 18.4        | 4.40                 |                        | -        |
| EW2303854004               | BH9                              | Groundwater                    | 18      | Sep 2023                | 548       | 216       |           |           | 84        | 0.56          |              | 2.45                      | 0.4               | 122.00             | < 0.01           | 0.01         | 58                   | 1,700                              | 1,700                     | 167                               |                  |                                    |                       |           | 7.10       | 3,760  | 17.7        | 3.25                 |                        | -        |
| EW2303854005               | BH12r                            | Groundwater                    | 17      | Sep 2023                | 223       | 183       |           |           | 27        | 0.54          |              | 9.62                      | 0.2               | 3.37               | 0.01             | 0.15         | 21                   | 516                                | 516                       | 184                               |                  |                                    |                       |           | 6.80       | 1,610  | 20.6        | 4.38                 |                        | -        |
| EW2303854006               | BH13                             | Groundwater                    | 10      | Sep 2023                | 330       | 219       |           |           | 29        | 0.45          |              | 3.34                      | 0.2               | 8.64               | < 0.01           | 4.43         | 36                   | 872                                | 872                       | 93                                |                  |                                    |                       |           | 6.70       | 2,210  | 21.5        | 4.39                 |                        | -        |
| EW2303854007               | BH14                             | Groundwater                    | 11      | Sep 2023                | 36        | 154       |           |           | 16        | 0.14          |              | 0.15                      | 0.5               | 1.42               | < 0.01           | 1.03         | 12                   | 563                                | 563                       | 37                                |                  |                                    |                       |           | 6.80       | 1,020  | 21.0        | 4.83                 |                        | -        |
| EW2303854008               | BH15                             | Groundwater                    | 7       | Sep 2023                | 459       | 133       |           |           | 153       | 0.30          |              | 10.40                     | 0.2               | 6.24               | 0.03             | < 0.01       | 37                   | 519                                | 519                       | 391                               |                  |                                    |                       |           | 7.00       | 2,180  | 14.3        | 0.89                 |                        | -        |
| EW2303854010               | BH18                             | Groundwater                    | 25      | Sep 2023                | 13        | 70        |           |           | 9         | 0.24          |              | 2.43                      | 0.2               | 1.44               | < 0.01           | < 0.01       | 14                   | 283                                | 283                       | 4                                 |                  |                                    |                       |           | 6.60       | 470  | 18.6        | 2.28                 |                        | -        |
| EW2303854009               | BH19r                            | Groundwater                    | 16      | Sep 2023                | 48        | 104       |           |           | 42        | 0.08          |              | 0.99                      | 0.1               | 3.05               | < 0.01           | 0.06         | 13                   | 358                                | 358                       | 58                                |                  |                                    |                       |           | 7.30       | 765  | 18.1        | 4.56                 |                        | -        |
| EW2303854011               | BH21                             | Groundwater                    | 23      | Sep 2023                | 328       | 196       |           |           | 28        | 0.23          |              | 0.16                      | 0.3               | 1.92               | 0.06             | 23.70        | 29                   | 783                                | 783                       | 183                               |                  |                                    |                       |           | 6.90       | 2,310  | 20.8        | 3.15                 |                        | -        |
| EW2303854012               | BH22                             | Groundwater                    | 24      | Sep 2023                | 147       | 159       |           |           | 16        | 0.28          |              | 25.90                     | 0.3               | 5.14               | < 0.10           | < 0.10       | 33                   | 428                                | 428                       | 326                               |                  |                                    |                       |           | 6.60       | 1,470  | 17.5        | 2.42                 |                        | -        |
| EW2303862001               | SWP1                             | Surfacewater                   | 1       | Sep 2023                | 145       | 58        | 26        | 127       | 18        | 0.26          | 0.17         | 0.06                      | 0.3               | 0.09               | < 0.01           | < 0.01       | 20                   | 316                                | 316                       | 23                                | 4.16             |                                    | < 5                   | 2.20      | 7.70       | 788  | 14.6        |                      |                        | -        |
| EW2303862003               | SWC_up                           | Surfacewater                   | 20      | Sep 2023                | 8,240     | 253       | 608       | 5,060     | 190       | 0.11          | 0.63         | 0.08                      | 0.7               | 0.54               | 0.02             | 0.09         | 8                    | 169                                | 169                       | 922                               | 5.02             |                                    | < 5                   | 4.60      | 7.20       | 22,000                                       | 15.4        |                      |                        | -        |
| EW2303862002               | SWC_2                            | Surfacewater                   | 19      | Sep 2023                | 10,000    | 283       | 726       | 5,940     | 250       | 0.28          | < 0.10       | < 0.10                    | 0.8               | 0.76               | 0.02             | 0.06         | 8                    | 163                                | 163                       | 1,720                             | 4.91             |                                    | < 5                   | 3.50      | 7.30       | 26,800                                       | 15.6        |                      |                        | -        |
| EW2303862004               | SWC_down                         | Surfacewater                   | 21      | Sep 2023                | 11,300    | 315       | 843       | 6,970     | 247       | 0.03          | 0.36         | < 0.10                    | 0.8               | 0.51               | 0.01             | 0.06         | 6                    | 160                                | 160                       | 1,840                             | 5.37             |                                    | < 5                   | 3.00      | 7.40       | 30,300                                       | 15.7        |                      |                        | -        |
| EW2303862005               | SWC_down_2                       | Surfacewater                   | 22      | Sep 2023                | 7,170     | 214       | 508       | 4,310     | 165       | 0.05          | 0.54         | < 0.05                    | 0.6               | 0.25               | 0.01             | 0.10         | 7                    | 150                                | 150                       | 795                               | 6.27             |                                    | < 5                   | 4.60      | 7.40       | 18,800                                       | 14.7        |                      |                        | -        |
| EW2303859001               | Leachate Storage Tank<br>LP1     | Leachate                       | 2       | Sep 2023                | 2,030     | 45        |           |           | 349       | 0.11          | 1.67         |                           | 0.2               | 391.00             | 12.20            | < 2.00       | 405                  | 1,970                              | 2,710                     | < 100                             | 5.25             | 60.3                               |                       |           | 8.90       | 8,180  | 19.9        |                      |                        | -        |
|                            |                                  |                                |         |                         |           |           |           |           |           |               |              |                           |                   |                    |                  |              |                      |                                    |                           |                                   |                  |                                    |                       |           |            |  |             |                      |                        |          |



|                          | T<br>March 2023 Qu                                     | ABLE 14-6<br>Jarter: Dur    | : Amm     | onia Re<br>Recycli                            | esults<br>ing and                               | I Waste De   | epot    |
|--------------------------|--|-----------------------------|-----------|---|---|--------------|---------|
|                          |  |                             | рН        | Assessme                                      | ent Criteria                                    | Result       |         |
| Ammonia Res<br>Trigger V | sults comapred against the<br>alues - ANZACC (2000) Ta | e pH Modified<br>bble 8.3.7 | pH (lab)  | pH Modifed Trigger Values - 95%<br>Freshwater | pH Modifed Trigger Values - 95%<br>Marine Water | Ammonai As N | Comment |
| Lab Roport No            | Total<br>Samula ID                                     | Concentrations - PQL        | 0.1       | -   | -   | 0.01         |         |
| EW2300850001             | BH1c   | 2/03/2023                   | рп<br>7.1 | 2.26  | 3.56  | 285          | > TV    |
| EW2300850002             | внз  | 2/03/2023                   | 7.3       | 1.88  | 2.84  | 10.6         | > TV    |
| EW2300850003             | BH4  | 2/03/2023                   | 7.4       | 1.75  | 2.49  | 2            | > TV    |
| EW2300850004             | BH9  | 2/03/2023                   | 7.2       | 1.99  | 3.2   | 122          | > TV    |
| EW2300850005             | BH12r  | 2/03/2023                   | 6.8       | 2.33  | 4.55  | 4.24         | > TV    |
| EW2300850006             | BH13   | 2/03/2023                   | 6.9       | 2.26  | 4.24  | 5.31         | > TV    |
| EW2300850007             | BH14   | 2/03/2023                   | 7         | 2.18  | 3.91  | 1.18         | < TV    |
| EW2300850008             | BH15   | 2/03/2023                   | 6.8       | 2.33  | 4.55  | 8.12         | > TV    |
| EW2300850010             | BH18   | 2/03/2023                   | 6.8       | 2.33  | 4.55  | 1.02         | < TV    |
| EW2300850009             | BH19r  | 2/03/2023                   | 7.5       | 1.61  | 2.15  | 2.28         | > TV    |
| EW2300850011             | BH21   | 2/03/2023                   | 7.2       | 1.99  | 3.2   | 2.64         | > TV    |
| EW2300850012             | BH22   | 2/03/2023                   | 7.5       | 1.61  | 2.15  | 35           | > TV    |
| EW2300849001             | SWP1   | 2/03/2023                   | 7.5       | 1.61  | 2.15  | 0.03         | < TV    |
| EW2300849003             | SWC_up   | 2/03/2023                   | 7.1       | 2.09  | 3.56  | 0.07         | < TV    |
| EW2300849002             | SWC_2  | 2/03/2023                   | 7.3       | 1.88  | 2.84  | 0.19         | < TV    |
| EW2300849004             | SWC_down   | 2/03/2023                   | 7.2       | 1.99  | 3.2   | 0.25         | < TV    |
| EW2300849005             | SWC_down_2   | 2/03/2023                   | 7.3       | 1.88  | 2.84  | 0.12         | < TV    |
| EW2300847001             | Leachate Storage Tank LP1                              | 2/03/2023                   | 9.4       | 0.21*   | 1.7   | 432          | > TV    |

 $^{\ast}$  No guideline is provided for a pH of above 8.9. Therefore the TV for pH 8.9 was abdopted.

|                |                                |   |                 | pН         | Assessme                                      | nt Criteria                                     | Result       |         |
|----------------|--------------------------------|---|-----------------|------------|---|---|--------------|---------|
| Ammonia Resu   | Ilts comapred<br>ANZAC         | against the pH Modified T<br>C (2000) Table 8.3.7<br>Tota | rigger Values - | 2 pH (lab) | pH Modifed Trigger Values - 95%<br>Freshwater | pH Modifed Trigger Values - 95%<br>Marine Water | Ammonai As N | Comment |
| Lab Report No. |                                | Sample ID.  | Date            | pH         | mg/L  | mg/L  | mg/L         |         |
| EW2300850001   |                                | BH1c  | 2/03/2023       | 7.00       | 2.180   | 3.560   | 298          | > TV    |
| EW2300850002   |                                | BH3   | 2/03/2023       | 7.50       | 1.161   | 2.150   | 12           | > TV    |
| EW2300850003   |                                | BH4   | 2/03/2023       | 7.40       | 1.750   | 2.490   | 2            | > TV    |
| EW2300850004   |                                | BH9   | 2/03/2023       | 7.20       | 1.990   | 3.200   | 141          | > TV    |
| EW2300850005   |                                | BH12r   | 2/03/2023       | 6.80       | 2.330   | 4.550   | 4            | > TV    |
| EW2300850006   | Groupdwater                    | BH13  | 2/03/2023       | 6.80       | 2.330   | 4.550   | 10           | > TV    |
| EW2300850007   | Gloundwater                    | BH14  | 2/03/2023       | 6.90       | 2.260   | 4.240   | 1            | < TV    |
| EW2300850008   |                                | BH15  | 2/03/2023       | 7.00       | 2.180   | 3.560   | 9            | > TV    |
| EW2300850010   |                                | BH18  | 2/03/2023       | 6.80       | 2.330   | 4.550   | 1            | < TV    |
| EW2300850009   |                                | BH19r   | 2/03/2023       | 7.40       | 1.750   | 2.490   | 2            | > TV    |
| EW2300850011   |                                | BH21  | 2/03/2023       | 7.20       | 1.990   | 3.200   | 4            | > TV    |
| EW2300850012   |                                | BH22  | 2/03/2023       | 7.30       | 1.880   | 2.840   | 4            | > TV    |
| EW2300849001   |                                | SWP1  | 2/03/2023       | 7.70       | 1.320   | 1.560   | 1            | < TV    |
| EW2300849003   |                                | SWC_up  | 2/03/2023       | 7.20       | 1.990   | 3.200   | 0            | < TV    |
| EW2300849002   | Rocklow Creek<br>Surface Water | SWC_2   | 2/03/2023       | 7.20       | 1.990   | 3.200   | 0            | < TV    |
| EW2300849004   |                                | SWC_down  | 2/03/2023       | 7.20       | 1.990   | 3.200   | 1            | < TV    |
| EW2300849005   |                                | SWC_down_2  | 2/03/2023       | 7.30       | 1.880   | 2.840   | 0            | < TV    |

#### TABLE 14-7: Ammonia Results March 2023 Quarter: Dunmore Recycling and Waste Depot

|                |                                |   |                      | рН       | Assessme                                      | nt Criteria                                     | Result       |         |
|----------------|--------------------------------|---|----------------------|----------|---|---|--------------|---------|
| Ammonia Resu   | Its comapred<br>ANZAC          | against the pH Modified T<br>C (2000) Table 8.3.7 | Frigger Values -     | (ца)) Нд | pH Modifed Trigger Values - 95%<br>Freshwater | pH Modifed Trigger Values - 95%<br>Marine Water | Ammonal As N | Comment |
| Lab Damast No. | 1                              | Total   | Concentrations - PQL | 0.1      | •   | -   | 0.01         |         |
| Lab Report No. |                                | Sample ID.  | Date                 | pН       | mg/L  | mg/L  | mg/L         |         |
| EW2300850001   |                                | BH1c  | 2/03/2023            | 6.90     | 2.260   | 4.424   | 314          | > TV    |
| EW2300850002   |                                | BH3   | 2/03/2023            | 7.30     | 1.880   | 2.840   | 29.2         | > TV    |
| EW2300850003   |                                | BH4   | 2/03/2023            | 7.30     | 1.880   | 2.840   | 1.68         | < TV    |
| EW2300850004   |                                | BH9   | 2/03/2023            | 7.10     | 2.090   | 3.560   | 122          | > TV    |
| EW2300850005   |                                | BH12r   | 2/03/2023            | 6.80     | 2.330   | 4.550   | 3.37         | > TV    |
| EW2300850006   | Groundwater                    | BH13  | 2/03/2023            | 6.70     | 2.380   | 4.830   | 8.64         | > TV    |
| EW2300850007   | Gloundwater                    | BH14  | 2/03/2023            | 6.80     | 2.330   | 4.550   | 1.42         | < TV    |
| EW2300850008   |                                | BH15  | 2/03/2023            | 7.00     | 2.180   | 3.910   | 6.24         | > TV    |
| EW2300850010   |                                | BH18  | 2/03/2023            | 6.60     | 2.430   | 5.070   | 1.44         | < TV    |
| EW2300850009   |                                | BH19r   | 2/03/2023            | 7.30     | 1.880   | 2.840   | 3.05         | > TV    |
| EW2300850011   |                                | BH21  | 2/03/2023            | 6.90     | 2.260   | 4.240   | 1.92         | < TV    |
| EW2300850012   |                                | BH22  | 2/03/2023            | 6.60     | 2.430   | 5.070   | 5.14         | > TV    |
| EW2300849001   |                                | SWP1  | 2/03/2023            | 7.70     | 1.320   | 1.560   | 0.09         | < TV    |
| EW2300849003   |                                | SWC_up  | 2/03/2023            | 7.20     | 1.990   | 3.200   | 0.54         | < TV    |
| EW2300849002   | Rocklow Creek<br>Surface Water | SWC_2   | 2/03/2023            | 7.30     | 1.880   | 2.840   | 0.76         | < TV    |
| EW2300849004   |                                | SWC_down  | 2/03/2023            | 7.40     | 1.750   | 2.490   | 0.51         | < TV    |
| EW2300849005   |                                | SWC_down_2  | 2/03/2023            | 7.40     | 1.750   | 2.490   | 0.25         | < TV    |

#### TABLE 14-8: Ammonia Results March 2023 Quarter: Dunmore Recycling and Waste Depot

## TABLE 14-9: Duplicate Groundwater Sample Results and QC Data

| Lab Report No.                            |       |       |            | EW2205534004 | EW2205534013 |            |       |
|---|-------|-------|------------|--------------|--------------|------------|-------|
| Sample No.                                |       |       |            | BH9          | GWDuplicate  |            |       |
| Sample type                               |       |       |            | Groundwater  | GWQC         |            | חחח   |
| EPA No,                                   |       |       |            | 18           | QC1          |            | RPD   |
| Date Sampled                              |       |       |            | 5/12/2022    | 5/12/2022    |            |       |
| Analyte                                   | Units | PQL   | 5 x<br>PQL | Result       | Result       |            |       |
| Chloride                                  | mg/L  | 1     | 5          | 392          | 390          | $\bigcirc$ | 0.51  |
| Calcium                                   | mg/L  | 1     | 5          | 180          | 177          | $\bigcirc$ | 1.68  |
| Potassium                                 | mg/L  | 1     | 5          | 69           | 68           |            | 1.46  |
| Manganese                                 | mg/L  | 0.001 | 0.005      | 0.679        | 0.670        | $\diamond$ | 1.33  |
| Dissolved Iron                            | mg/L  | 0.05  | 0.25       | 0.32         | 0.31         | $\bigcirc$ | 3.17  |
| Fluoride                                  | mg/L  | 0.1   | 0.5        | 0.40         | 0.30         |            | 28.57 |
| Ammonia as N                              | mg/L  | 0.01  | 0.05       | 124.00       | 119.00       |            | 4.12  |
| 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       | $\bigcirc$ | 0.00  |
| Nitrite + Nitrate as N                    | mg/L  | 0.01  | 0.05       | < 0.01       | < 0.01       | $\diamond$ | 0.00  |
| Total Organic Carbon                      | mg/L  | 1     | 5          | 79           | 80           | $\diamond$ | 1.26  |
| Bicarbonate Alkalinity<br>as CaCO3        | mg/L  | 1     | 5          | 1,820        | 1,820        | ⊘          | 0.00  |
| Total Alkalinity as<br>CaCO3              | mg/L  | 1     | 5          | 1,820        | 1,820        |            | 0.00  |
| Sulfate as SO4 -<br>Turbidimetric         | mg/L  | 1     | 5          | < 10         | < 10         |            | 0.00  |
| рН  | рН    | 0.01  | 0.05       | 7.30         | 7.30         | >          | 0.00  |
| Electrical Conductivity (Non Compensated) | μS/cm | 1     | 5          | 3,580        | 3,580        |            | 0.00  |
| Temperature                               | °C    | 0.1   | 0.5        | 18.7         | 18.7         |            | 0.00  |
| Standing Water Level                      | mbgl  | -     |            | 2.94         | 2.94         |            | 0.00  |

### TABLE 14-10: Duplicate Surface Water Results and QC Data

| Lab Report No.                            |       |       |            | EW2205529002 | EW2205529006 |              |       |
|---|-------|-------|------------|--------------|--------------|--------------|-------|
| Sample No.                                |       |       |            | SWC_2        | SWDuplicate  |              |       |
| Sample type                               |       |       |            | Surfacewater | OffSiteSWQC  | ĺ            | חחח   |
| EPA No,                                   |       |       |            | 19           | QC2          | 1            | RPD   |
| Date Sampled                              |       |       |            | 2/12/2022    | 2/12/2022    | 1            |       |
| Analyte                                   | Units | PQL   | 5 x<br>PQL | Result       | Result       |              |       |
| Chloride                                  | mg/L  | 1     | 5          | 5,380        | 5,390        |              | 0.19  |
| Calcium                                   | mg/L  | 1     | 5          | 124          | 127          |              | 2.39  |
| Potassium                                 | mg/L  | 1     | 5          | 101          | 106          | $\mathbf{O}$ | 4.83  |
| Manganese                                 | mg/L  | 0.001 | 0.005      | 0.165        | 0.161        | $\bigcirc$   | 2.45  |
| Total Iron                                | mg/L  | 0.05  | 0.25       | 1.20         | 1.11         | $\bigcirc$   | 7.79  |
| Dissolved Iron                            | mg/L  | 0.05  | 0.25       | < 0.05       | < 0.05       |              | 0.00  |
| Fluoride                                  | mg/L  | 0.1   | 0.5        | 0.6          | 0.6          | $\bigcirc$   | 0.00  |
| Ammonia as N                              | mg/L  | 0.01  | 0.05       | 0.53         | 0.60         | $\bigcirc$   | 12.39 |
| Nitrite as N                              | mg/L  | 0.01  | 0.05       | 0.01         | 0.01         |              | 0.00  |
| Nitrate as N                              | mg/L  | 0.01  | 0.05       | 0.11         | 0.11         |              | 0.00  |
| Nitrite + Nitrate as N                    | mg/L  | 0.01  | 0.05       | 0.12         | 0.12         | $\bigcirc$   | 0.00  |
| Total Organic Carbon                      | mg/L  | 1     | 5          | 9            | 9            | $\bigcirc$   | 0.00  |
| Bicarbonate Alkalinity<br>as CaCO3        | mg/L  | 1     | 5          | 141          | 132          |              | 6.59  |
| Total Alkalinity as<br>CaCO3              | mg/L  | 1     | 5          | 141          | 132          |              | 6.59  |
| Sulfate as SO4 -<br>Turbidimetric         | mg/L  | 1     | 5          | 680          | 704          |              | 3.47  |
| Dissolved Oxygen                          | mg/L  | 0.01  | 0.05       | 5.80         | 5.81         |              | 0.17  |
| рН  | рН    | 0.01  | 0.05       | 7.00         | 7.00         |              | 0.00  |
| Electrical Conductivity (Non Compensated) | μS/cm | 1     | 5          | 14,100       | 14,100       |              | 0.00  |
| Temperature                               | °C    | 0.1   | 0.5        | 18.7         | 18.7         |              | 0.00  |

## TABLE 14-11: Duplicate Groundwater Sample Results and QC Data

| Lab Report No.                            |       |       |            | EW2300850010 | EW2300850013 |              |      |
|---|-------|-------|------------|--------------|--------------|--------------|------|
| Sample No.                                |       |       |            | BH18         | GWDuplicate  | 1            |      |
| Sample type                               |       |       |            | Groundwater  | GWQC         |              | חחח  |
| EPA No,                                   |       |       |            | 25           | QC1          |              | RPD  |
| Date Sampled                              |       |       |            | 2/03/2023    | 2/03/2023    |              |      |
| Analyte                                   | Units | PQL   | 5 x<br>PQL | Result       | Result       |              |      |
| Chloride                                  | mg/L  | 1     | 5          | 31           | 32           | >            | 3.17 |
| Calcium                                   | mg/L  | 1     | 5          | 80           | 81           | $\bigcirc$   | 1.24 |
| Potassium                                 | mg/L  | 1     | 5          | 11           | 11           | $\bigcirc$   | 0.00 |
| Manganese                                 | mg/L  | 0.001 | 0.005      | 0.139        | 0.142        | $\bigcirc$   | 2.14 |
| Dissolved Iron                            | mg/L  | 0.05  | 0.25       | 2.02         | 2.02         | $\mathbf{S}$ | 0.00 |
| Fluoride                                  | mg/L  | 0.1   | 0.5        | 0.20         | 0.20         |              | 0.00 |
| Ammonia as N                              | mg/L  | 0.01  | 0.05       | 1.02         | 1.10         |              | 7.55 |
| 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       | $\bigcirc$   | 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<br>as CaCO3        | mg/L  | 1     | 5          | 272          | 281          | 8            | 3.25 |
| Total Alkalinity as<br>CaCO3              | mg/L  | 1     | 5          | 272          | 281          |              | 3.25 |
| Sulfate as SO4 -<br>Turbidimetric         | mg/L  | 1     | 5          | < 10         | < 10         |              | 0.00 |
| рН  | рН    | 0.01  | 0.05       | 6.80         | 6.80         |              | 0.00 |
| Electrical Conductivity (Non Compensated) | μS/cm | 1     | 5          | 601          | 601          |              | 0.00 |
| Temperature                               | °C    | 0.1   | 0.5        | 20.8         | 20.8         |              | 0.00 |
| Standing Water Level                      | mbgl  | -     |            | 2.10         | 2.10         |              | 0.00 |

### TABLE 14-12: Duplicate Surface Water Results and QC Data

| Lab Report No.                            |       |       |            | EW2300849001 | EW2300849006 |              |    |
|---|-------|-------|------------|--------------|--------------|--------------|----|
| Sample No.                                |       |       |            | SWP1         | SWDuplicate  |              |    |
| Sample type                               |       |       |            | Surfacewater | OffSiteSWQC  | חחח          |    |
| EPA No,                                   |       |       |            | 1            | QC2          | RPD          |    |
| Date Sampled                              |       |       |            | 1/03/2023    | 1/03/2023    |              |    |
| Analyte                                   | Units | PQL   | 5 x<br>PQL | Result       | Result       |              |    |
| Chloride                                  | mg/L  | 1     | 5          | 147          | 154          | 4.65         | 5  |
| Calcium                                   | mg/L  | 1     | 5          | 67           | 66           | 1.50         | )  |
| Potassium                                 | mg/L  | 1     | 5          | 13           | 13           | 0.00         | )  |
| Manganese                                 | mg/L  | 0.001 | 0.005      | 0.570        | 0.426        | 28.9         | 2  |
| Total Iron                                | mg/L  | 0.05  | 0.25       | 1.45         | 1.33         | 8.63         | }  |
| Dissolved Iron                            | mg/L  | 0.05  | 0.25       | 0.20         | 0.19         | <b>S</b> .13 | 3  |
| Fluoride                                  | mg/L  | 0.1   | 0.5        | 0.3          | 0.3          | 0.00         | )  |
| Ammonia as N                              | mg/L  | 0.01  | 0.05       | 0.03         | 0.01         | 🚫 100.C      | )0 |
| 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          | 24           | 16           | 8 40.0       | 0  |
| Bicarbonate Alkalinity<br>as CaCO3        | mg/L  | 1     | 5          | 397          | 435          | <b>9</b> .13 | 3  |
| Total Alkalinity as<br>CaCO3              | mg/L  | 1     | 5          | 397          | 435          | <b>9</b> .13 | 3  |
| Sulfate as SO4 -<br>Turbidimetric         | mg/L  | 1     | 5          | 53           | 54           | 1.87         | 7  |
| Dissolved Oxygen                          | mg/L  | 0.01  | 0.05       | 8.53         | 8.51         | 0.23         | }  |
| рН  | рН    | 0.01  | 0.05       | 7.50         | 7.70         | 2.63         | }  |
| Electrical Conductivity (Non Compensated) | μS/cm | 1     | 5          | 1,210        | 1,210        | 0.00         | )  |
| Temperature                               | °C    | 0.1   | 0.5        | 21.9         | 21.9         | 0.00         | )  |

### TABLE 14-13: Duplicate Groundwater Sample Results and QC Data

| Lab Report No.                               |       |       |            | EW2302416010 | EW2302416013 |              |      |  |
|--|-------|-------|------------|--------------|--------------|--------------|------|--|
| Sample No.                                   |       |       |            | BH18         | GWDuplicate  |              |      |  |
| Sample type                                  |       |       |            | Groundwater  | GWQC         |              |      |  |
| EPA No,                                      |       |       | 25         | QC1          |              | RPD          |      |  |
| Date Sampled                                 |       |       | 2/06/2023  | 2/06/2023    |              |              |      |  |
| Analyte                                      | Units | PQL   | 5 x<br>PQL | Result       | Result       |              |      |  |
| Chloride                                     | mg/L  | 1     | 5          | 16           | 16           | $\mathbf{S}$ | 0.00 |  |
| Calcium                                      | mg/L  | 1     | 5          | 60           | 61           | $\mathbf{S}$ | 1.65 |  |
| Potassium                                    | mg/L  | 1     | 5          | 10           | 10           |              | 0.00 |  |
| Manganese                                    | mg/L  | 0.001 | 0.005      | 0.067        | 0.068        | $\bigcirc$   | 1.48 |  |
| Dissolved Iron                               | mg/L  | 0.05  | 0.25       | 1.31         | 1.33         | $\bigcirc$   | 1.52 |  |
| Fluoride                                     | mg/L  | 0.1   | 0.5        | 0.20         | 0.20         | $\bigcirc$   | 0.00 |  |
| Ammonia as N                                 | mg/L  | 0.01  | 0.05       | 1.05         | 1.06         | $\bigcirc$   | 0.95 |  |
| Nitrite as N                                 | mg/L  | 0.01  | 0.05       | < 0.01       | < 0.01       | $\bigcirc$   | 0.00 |  |
| Nitrate as N                                 | mg/L  | 0.01  | 0.05       | < 0.01       | < 0.01       | $\bigcirc$   | 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           | $\bigcirc$   | 0.00 |  |
| Bicarbonate Alkalinity<br>as CaCO3           | mg/L  | 1     | 5          | 267          | 268          |              | 0.37 |  |
| Total Alkalinity as<br>CaCO3                 | mg/L  | 1     | 5          | 267          | 268          |              | 0.37 |  |
| Sulfate as SO4 -<br>Turbidimetric            | mg/L  | 1     | 5          | < 10         | < 10         |              | 0.00 |  |
| рН   | pН    | 0.01  | 0.05       | 6.80         | 6.80         |              | 0.00 |  |
| Electrical Conductivity<br>(Non Compensated) | μS/cm | 1     | 5          | 511          | 511          |              | 0.00 |  |
| Temperature                                  | °C    | 0.1   | 0.5        | 20.7         | 20.7         |              | 0.00 |  |
| Standing Water Level                         | mbgl  | -     |            | 2.26         | 2.26         |              | 0.00 |  |

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

|  |       |       |            |              |              | -            |        |  |  |
|--|-------|-------|------------|--------------|--------------|--------------|--------|--|--|
| Lab Report No.                               |       |       |            | EW2302415001 | EW2302415006 |              |        |  |  |
| Sample No.                                   |       |       |            | SWP1         | SWDuplicate  |              |        |  |  |
| Sample type                                  |       |       |            | Surfacewater | OffSiteSWQC  |              | חחח    |  |  |
| EPA No,                                      |       |       |            | 1            | QC2          |              | RPD    |  |  |
| Date Sampled                                 |       |       | 2/06/2023  | 2/06/2023    |              |              |        |  |  |
| Analyte                                      | Units | PQL   | 5 x<br>PQL | Result       | Result       |              |        |  |  |
| Chloride                                     | mg/L  | 1     | 5          | 173          | 6,790        | 8            | 190.06 |  |  |
| Calcium                                      | mg/L  | 1     | 5          | 73           | 172          | 8            | 80.82  |  |  |
| Potassium                                    | mg/L  | 1     | 5          | 17           | 140          | ×            | 156.69 |  |  |
| Manganese                                    | mg/L  | 0.001 | 0.005      | 0.116        | 0.077        | $\otimes$    | 40.41  |  |  |
| Total Iron                                   | mg/L  | 0.05  | 0.25       | 0.16         | 0.93         | 8            | 141.28 |  |  |
| Dissolved Iron                               | mg/L  | 0.05  | 0.25       | < 0.05       | < 0.05       | $\bigcirc$   | 0.00   |  |  |
| Fluoride                                     | mg/L  | 0.1   | 0.5        | 0.3          | 0.6          | $\otimes$    | 66.67  |  |  |
| Ammonia as N                                 | mg/L  | 0.01  | 0.05       | 0.96         | 0.32         | $\otimes$    | 100.00 |  |  |
| Nitrite as N                                 | mg/L  | 0.01  | 0.05       | 0.04         | 0.03         | $\bigcirc$   | 28.57  |  |  |
| Nitrate as N                                 | mg/L  | 0.01  | 0.05       | < 0.01       | 0.11         | $\otimes$    | 166.67 |  |  |
| Nitrite + Nitrate as N                       | mg/L  | 0.01  | 0.05       | 0.03         | 0.14         | $\otimes$    | 129.41 |  |  |
| Total Organic Carbon                         | mg/L  | 1     | 5          | 25           | 8            | ×            | 103.03 |  |  |
| Bicarbonate Alkalinity<br>as CaCO3           | mg/L  | 1     | 5          | 431          | 141          | 8            | 101.40 |  |  |
| Total Alkalinity as<br>CaCO3                 | mg/L  | 1     | 5          | 431          | 141          | $\bigotimes$ | 101.40 |  |  |
| Sulfate as SO4 -<br>Turbidimetric            | mg/L  | 1     | 5          | 39           | 915          | $\bigotimes$ | 183.65 |  |  |
| Dissolved Oxygen                             | mg/L  | 0.01  | 0.05       | 5.90         | 6.32         | $\bigcirc$   | 6.87   |  |  |
| рН   | рН    | 0.01  | 0.05       | 7.70         | 7.20         | $\bigcirc$   | 6.71   |  |  |
| Electrical Conductivity<br>(Non Compensated) | µS/cm | 1     | 5          | 1,080        | 17,400       | 8            | 176.62 |  |  |
| Temperature                                  | °C    | 0.1   | 0.5        | 13.4         | 15.0         |              | 11.27  |  |  |

## TABLE 14-15: Duplicate Groundwater Sample Results and QC Data

| Lab Report No.                            |       |       |            | EW2303854010 | EW2303854013 |              |      |  |
|---|-------|-------|------------|--------------|--------------|--------------|------|--|
| Sample No.                                |       |       |            | BH18         | GWDuplicate  |              |      |  |
| Sample type                               |       |       |            | Groundwater  | GWQC         |              | חחם  |  |
| EPA No,                                   |       |       |            | 25           | QC1          |              | RFD  |  |
| Date Sampled                              |       |       |            | 1/09/2023    | 1/09/2023    |              |      |  |
| Analyte                                   | Units | PQL   | 5 x<br>PQL | Result       | Result       |              |      |  |
| Chloride                                  | mg/L  | 1     | 5          | 13           | 13           | $\bigcirc$   | 0.00 |  |
| Calcium                                   | mg/L  | 1     | 5          | 70           | 71           | $\bigcirc$   | 1.42 |  |
| Potassium                                 | mg/L  | 1     | 5          | 9            | 9            |              | 0.00 |  |
| Manganese                                 | mg/L  | 0.001 | 0.005      | 0.241        | 0.242        | $\mathbf{S}$ | 0.41 |  |
| Dissolved Iron                            | mg/L  | 0.05  | 0.25       | 2.43         | 2.46         |              | 1.23 |  |
| Fluoride                                  | mg/L  | 0.1   | 0.5        | 0.20         | 0.20         |              | 0.00 |  |
| Ammonia as N                              | mg/L  | 0.01  | 0.05       | 1.44         | 1.31         | $\bigcirc$   | 9.45 |  |
| Nitrite as N                              | mg/L  | 0.01  | 0.05       | < 0.01       | < 0.01       | $\bigcirc$   | 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           | 15           |              | 6.90 |  |
| Bicarbonate Alkalinity<br>as CaCO3        | mg/L  | 1     | 5          | 283          | 279          |              | 1.42 |  |
| Total Alkalinity as<br>CaCO3              | mg/L  | 1     | 5          | 283          | 279          |              | 1.42 |  |
| Sulfate as SO4 -<br>Turbidimetric         | mg/L  | 1     | 5          | 4            | 4            |              | 0.00 |  |
| рН  | pН    | 0.01  | 0.05       | 6.60         | 6.60         | $\bigcirc$   | 0.00 |  |
| Electrical Conductivity (Non Compensated) | μS/cm | 1     | 5          | 470          | 470          |              | 0.00 |  |
| Temperature                               | °C    | 0.1   | 0.5        | 18.6         | 18.6         |              | 0.00 |  |
| Standing Water Level                      | mbgl  | -     |            | 2.28         | 2.38         |              | 4.29 |  |

## TABLE 14-16: Duplicate Surface Water Results and QC Data

| Lab Report No.                            |       |       |            | EW2303862001 | EW2303862006 |              |        |
|---|-------|-------|------------|--------------|--------------|--------------|--------|
| Sample No.                                |       |       |            | SWP1         | SWDuplicate  |              |        |
| Sample type                               |       |       |            | Surfacewater | OffSiteSWQC  |              | חחם    |
| EPA No,                                   |       |       |            | 1            | QC2          |              | RFD    |
| Date Sampled                              |       |       | 1/09/2023  | 1/09/2023    |              |              |        |
| Analyte                                   | Units | PQL   | 5 x<br>PQL | Result       | Result       |              |        |
| Chloride                                  | mg/L  | 1     | 5          | 145          | 10,100       | $\otimes$    | 194.34 |
| Calcium                                   | mg/L  | 1     | 5          | 58           | 282          | 8            | 131.76 |
| Potassium                                 | mg/L  | 1     | 5          | 18           | 218          | $\otimes$    | 169.49 |
| Manganese                                 | mg/L  | 0.001 | 0.005      | 0.263        | 0.042        | $\otimes$    | 144.92 |
| Total Iron                                | mg/L  | 0.05  | 0.25       | 0.17         | 0.43         | $\otimes$    | 86.67  |
| Dissolved Iron                            | mg/L  | 0.05  | 0.25       | 0.06         | < 0.10       | $\otimes$    | 50.00  |
| Fluoride                                  | mg/L  | 0.1   | 0.5        | 0.3          | 0.7          | $\otimes$    | 80.00  |
| Ammonia as N                              | mg/L  | 0.01  | 0.05       | 0.09         | 0.76         | 8            | 157.65 |
| Nitrite as N                              | mg/L  | 0.01  | 0.05       | < 0.01       | 0.02         | 8            | 66.67  |
| Nitrate as N                              | mg/L  | 0.01  | 0.05       | < 0.01       | 0.06         | 8            | 142.86 |
| Nitrite + Nitrate as N                    | mg/L  | 0.01  | 0.05       | < 0.01       | 0.08         | $\bigotimes$ | 155.56 |
| Total Organic Carbon                      | mg/L  | 1     | 5          | 20           | 7            | 8            | 96.30  |
| Bicarbonate Alkalinity<br>as CaCO3        | mg/L  | 1     | 5          | 316          | 163          | 8            | 63.88  |
| Total Alkalinity as<br>CaCO3              | mg/L  | 1     | 5          | 316          | 163          | 8            | 63.88  |
| Sulfate as SO4 -<br>Turbidimetric         | mg/L  | 1     | 5          | 23           | 1,610        | 8            | 194.37 |
| Dissolved Oxygen                          | mg/L  | 0.01  | 0.05       | 4.16         | 4.91         | $\bigcirc$   | 16.54  |
| рН  | pН    | 0.01  | 0.05       | 7.70         | 7.30         |              | 5.33   |
| Electrical Conductivity (Non Compensated) | µS/cm | 1     | 5          | 788          | 26,800       | 8            | 188.57 |
| Temperature                               | °C    | 0.1   | 0.5        | 14.6         | 15.6         |              | 6.62   |



# **CHARTS**

ENRS0033\_SCC Dunmore Landfill\_AEMR 2022-2023













#### Charts 47-61 Leachate Water Quality Charts

































# **APPENDICES**

ENRS0033\_SCC Dunmore Landfill\_AEMR 2022-2023



## Appendix A: EPL 5984 Sampling Point Summary (NSW EPA, 10/02/2022)

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



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





**Appendix B:** 

Laboratory Chain of Custody (COC) & Certificates of Analysis

(COA) – Water Samples – Quarter 1

CHAIN OF CUSTODY Sydney 277 Woodcark Rd, Smithfield NSW 2176
 Ph: 02 8784 8555 E samples.sydney@alserviro.com C Brisbane: 32 Shand St. Stafford QLD 4053 CI Melbourne, 2-4 Westal Rd, Springvald VIC 3171 Ph:07-3243-7222 Eisamples.brsbane@alsenvib.com Ph 03 5549 6600 E: camples, resbourne@alsenvirc.com Ph. de 1776 door, E. sampled syntregigationement owner D. Newcastler S. Rosequer, R., Waranove, NSW 200 Ph.02, 4968 0438 Elsemples newcastle@attemice.com Ph.02, 4968 0438 Elsemples newcastle@attemice.com ALS Laboratory: please tick -> ALS Adelaide: 2-1 Burna Rd, Pooraka SA 6095
 Physics and Control Rd, Pooraka SA 6095
 Physics and Control Rd, Pooraka SA 6095

Cl. Parth: 10 Hod Way, Malaga WA 6090 Ph. 08 9209 7665 €∵saniples.perth@aisenviro.com C Launceston: 27 Wellington St, Launceston TAS 7250

| CLIENT:            | Shellharbour City Council      |  | TURNAR      |  |                     |            |   |   | ବୟୁକାରମୋହା ପ. ୯୨     | n:                 | Ph. 03 633          | 11 2158 Er laun     | nceston@aisenv     | iro.com                          |
|--------------------|--------------------------------|--|-------------|--|---------------------|------------|---|---|----------------------|--------------------|---------------------|---------------------|--------------------|----------------------------------|
| OFFICE:            | 41 Burelli St WOLLONGONG NSW   | IG NSW 2500 (Standard TAT may be longer for some tests |             |  |                     |            |   |   |                      | ONLY (Circle)      |                     |                     |                    |                                  |
| PROJECT:           | Dunmore Quarterly Ground Water | rs EPL   | ALS QUO     | DTE NO.: WO/030                              | 0/19 TENDER         | urgent IAI | List due dat                                    | e):   |                      |                    | Cuk                 | stody Seal ich      | tect?              |                                  |
| ORDER NUMBER:      |                                |  |             |  |                     |            |   |   |                      | BER (Circle        | e) reca             | eipt?               | r cer pricke presi | ant upon Na                      |
| PROJECT MANAGER:   | Ryan Stirling                  |  |             |  |                     |            | OF  |   | : 34<br>; 34         | 56                 | 7 Rar               | idom Sample         | • Temperature c    | n Receipt 5 + 3 inc              |
| SAMPLER:           | bert. Da                       | Li'O SAMPLERI  | OBILE:      |  | RELINQUISHED BY:    | . <u> </u> | RE  | CEIVED BY   |                      |                    |                     |                     |                    |                                  |
| Email Penorte to   | (YES / NO)                     | EDD FORM   | AT (or defa | ult):  | Robert              | Del        | Lio   | Ano   | fe "                 | 1                  |                     |                     |                    | Environmental Division           |
| Email Invoice to : |                                | · · · · · · · · · · · · · · · · · · ·                  |             | I  | DATE/TIME:          |            | DAT   | E/TIME:   |                      |                    | DATE/TIN            | ΛE:                 | 1                  | Wollongong                       |
| COMMENTS/SPECIAL   | HANDLING/STORAGE OR DISPOSA    | L: CC reports to:                                      |             |  | 5/12/22             | <u> </u>   | 3:30.   | 5/1   | 2/2                  | 2                  |                     |                     |                    | EW2205534                        |
| ALS USE ONLY       | SAMPLI<br>MATRIX: So           | E DETAILS<br>lid(S) Water(W)                           |             | CONTAINER INFO                               | RMATION             | ANAL       | YSIS REQUI                                      | RED includ  | ing SUITES           | (NB. Suite Co      | des must be i       | isted to attrac     | ct suite pri       |                                  |
|                    | a                              |  |             |  |                     | Wh         | ere Metals are re                               | Is are required, specify Total (unfiltered bottle required) or Dissolve |                      |                    |                     | d filtered bottle r | required).         |                                  |
| LABID              | SAMPLE ID                      | DATE / TIME  | MATRIX      | TYPE & PRESERVATIV<br>(refer to codes below) | /E TOTAL<br>BOTTLES | Ammonia    | NT-2A (Alka,<br>So4, Cl, Fl)<br>Filtered Ca, K, | Toc   | Dissolved Fe &<br>Mn | VT-4 (NO2,<br>VO3) | dend to<br>curafins |                     |                    | Telephone : 02 42253125          |
|                    | BH1C 5.                        | 12.22 9:30   | , w         |  |                     | 1          | 1   | 1   |                      |                    |                     |                     |                    | Field Tests - pH, EC, Temp & SWL |
|                    | вна                            | 12:55  | w           |  |                     | 1          | 1   | 1   | 1                    | 1                  | 1                   |                     | <u>†</u>           | Field Tests - pH, EC, Temp & SWL |
|                    | BH4                            | 13:45  | w           |  |                     | 1          | 1   | 1   | 1                    | 1                  | 1                   |                     | +                  | Field Tests - pH, EC, Temp & SWL |
|                    |                                | 8:35   | w           |  |                     | <b>√</b>   | 1   | 1   | 1                    | 1                  |                     |                     |                    | Field Tests - pH, EC, Temp & SWL |
|                    | BH12R                          | 11:50  | w           |  |                     | ✓          | 1   | 1   | 1                    | 1                  |                     |                     |                    | Field Tests - pH, EC, Temp & SWL |
|                    | BH13                           | 12:10  | w           |  |                     | 1          | 1   | 1   | 1                    | 1                  |                     |                     |                    | Field Tests - pH, EC, Temp & SWL |
|                    | BH14                           | 12:30  |             |  |                     | ¥          | ~   | 4   | 1                    | 1                  |                     |                     |                    | Field Tests - pH, EC, Temp & SWL |
|                    | BH100                          | 11:15  |             |  |                     | <b>_</b>   | 1   | 1   | 1                    | 1                  |                     |                     |                    | Field Tests - pH, EC, Temp & SWL |
|                    | BU19                           | 13.20  |             |  |                     | -          | 1   | ×   | 1                    | 1                  |                     | i                   |                    | Field Tests - pH, EC, Temp & SWL |
|                    | BH21                           | 10:50  |             |  |                     |            | 1   | <b>√</b>  | 1                    | 1                  |                     |                     |                    | Field Tests - pH, EC, Temp & SWL |
|                    | BH22                           | 10:20  | • W         |  |                     | 1          | ×   | <b>√</b>  | ×                    | 1                  |                     |                     |                    | Field Tests - pH, EC, Temp & SWL |
|                    | Duplicate                      | 9:55   |             |  |                     |            | ×   | <b>~</b>  | ~                    | 1                  |                     |                     |                    | Field Tests - pH, EC, Temp & SWL |
| j.                 | Triplicate                     | 1 2:35   | WW          |  |                     | <b>√</b>   |   | <b></b>   |                      |                    |                     |                     |                    | Field Tests - pH, EC, Temp & SWL |
|                    |                                | V 0.79   |             |  |                     |            |   |   |                      |                    |                     |                     |                    |                                  |
|                    |                                |  |             |  |                     | <u> </u>   |   |   |                      |                    |                     |                     |                    |                                  |
|                    | é                              |  |             |  |                     |            |   |   |                      |                    |                     |                     |                    |                                  |
| Lat. St            | ANTER ST                       |  |             |  | TOTAL 10            |            |   |   |                      |                    |                     |                     |                    |                                  |

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic; ORC = Nitric Preserved Plastic; ORC = Nitric Preserved; AP - Airfreight Unpreserved; AP - Airfreight Unpreserve V a VOA Vial HCI Preserved Flastic, N = Plante Flaste, OKC = Natice Flaste, OKC = Natice Flaster, OKC = Natice


# **CERTIFICATE OF ANALYSIS**

| Work Order              | EW2205534                                     | Page                    | : 1 of 8   |
|-------------------------|---|-------------------------|--|
| Client                  | SHELLHARBOUR CITY COUNCIL                     | Laboratory              | Environmental Division NSW South Coast                     |
| Contact                 | : Ryan Stirling                               | Contact                 | : Aneta Prosaroski   |
| Address                 | : LAMERTON HOUSE, LAMERTON CRESCENT           | Address                 | : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia |
|                         | SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529 |                         |  |
| Telephone               | :   | Telephone               | : +61 2 4225 3125  |
| Project                 | : Dunmore Quarterly Groundwaters EPL          | Date Samples Received   | : 05-Dec-2022 16:46  |
| Order number            | : 1045179                                     | Date Analysis Commenced | : 05-Dec-2022  |
| C-O-C number            | :   | Issue Date              | : 20-Dec-2022 13:48  |
| Sampler                 | : Robert DaLio                                |                         | Hac-MRA NATA   |
| Site                    | : DUNMORE LANDFILL TENDER                     |                         |  |
| Quote number            | : WO/030/19 TENDER GROUNDWATERS               |                         | Accorditation No. 925                                      |
| No. of samples received | : 14  |                         | Accredited for compliance with                             |
| No. of samples analysed | : 13  |                         | ISO/IEC 17025 - Testing                                    |

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

#### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| Signatories      | Position                              | Accreditation Category             |
|------------------|---------------------------------------|------------------------------------|
| Aneta Prosaroski | Environmental Services Representative | Administration - Wollongong, NSW   |
| Aneta Prosaroski | Environmental Services Representative | Laboratory - Wollongong, NSW       |
| Ankit Joshi      | Senior Chemist - Inorganics           | Sydney Inorganics, Smithfield, NSW |
| Wisam Marassa    | Inorganics Coordinator                | Sydney Inorganics, Smithfield, NSW |



#### **General Comments**

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- Analytical work for this work order will be conducted at ALS Sydney.
- ED041G: LOR raised for Sulfate on sample 4 & 13 due to sample matrix.
- ED041G: LOR raised for Sulfate on sample 1 due to sample matrix.
- EK057G: It has been noted that Nitrite is greater than NOX. (Confirmed by re-analysis)
- It has been noted that Nitrite is greater than NOx for sample 9, however this difference is within the limits of experimental variation.
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Sampling and groundwater depth measurements completed by ALS Wollongong via inhouse sampling method EN/67.11 Groundwater Sampling via Bailer Method.
- Temperature performed by ALS Wollongong via in-house method EA116 and EN67 PK.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.
- Sample collection of Ground Waters by in-house EN67 where the "surface layer of the aquifer was sampled".
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.</li>



| Sub-Matrix: WATER<br>(Matrix: WATER)     |                 |        | Sample ID       | BH1C              | BH3               | BH4               | BH9               | BH12R             |
|--|-----------------|--------|-----------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|  |                 | Sampli | ing date / time | 05-Dec-2022 09:30 | 05-Dec-2022 12:55 | 05-Dec-2022 13:45 | 05-Dec-2022 08:35 | 05-Dec-2022 11:50 |
| Compound                                 | CAS Number      | LOR    | Unit            | EW2205534-001     | EW2205534-002     | EW2205534-003     | EW2205534-004     | EW2205534-005     |
|  |                 |        |                 | Result            | Result            | Result            | Result            | Result            |
| EA005FD: Field pH                        |                 |        |                 |                   |                   |                   |                   |                   |
| рН                                       |                 | 0.1    | pH Unit         | 7.0               | 8.1               | 8.2               | 7.3               | 7.3               |
| EA010FD: Field Conductivity              |                 |        |                 |                   |                   |                   |                   |                   |
| Electrical Conductivity (Non             |                 | 1      | µS/cm           | 7160              | 1160              | 692               | 3580              | 1340              |
| Compensated)                             |                 |        |                 |                   |                   |                   |                   |                   |
| EA116: Temperature                       |                 |        |                 |                   |                   |                   |                   |                   |
| Temperature                              |                 | 0.5    | °C              | 25.2              | 17.6              | 17.6              | 18.7              | 19.4              |
| ED037P: Alkalinity by PC Titrator        |                 |        |                 |                   |                   |                   |                   |                   |
| Hydroxide Alkalinity as CaCO3            | DMO-210-001     | 1      | mg/L            | <1                | <1                | <1                | <1                | <1                |
| Carbonate Alkalinity as CaCO3            | 3812-32-6       | 1      | mg/L            | <1                | <1                | <1                | <1                | <1                |
| Bicarbonate Alkalinity as CaCO3          | 71-52-3         | 1      | mg/L            | 2780              | 330               | 297               | 1820              | 568               |
| Total Alkalinity as CaCO3                |                 | 1      | mg/L            | 2780              | 330               | 297               | 1820              | 568               |
| ED041G: Sulfate (Turbidimetric) as SO4 2 | - by DA         |        |                 |                   |                   |                   |                   |                   |
| Sulfate as SO4 - Turbidimetric           | 14808-79-8      | 1      | mg/L            | <10               | 158               | 61                | <10               | 119               |
| ED045G: Chloride by Discrete Analyser    |                 |        |                 |                   |                   |                   |                   |                   |
| Chloride                                 | 16887-00-6      | 1      | mg/L            | 904               | 140               | 50                | 392               | 107               |
| ED093F: Dissolved Major Cations          |                 |        |                 |                   |                   |                   |                   |                   |
| Calcium                                  | 7440-70-2       | 1      | mg/L            | 133               | 126               | 86                | 180               | 154               |
| Potassium                                | 7440-09-7       | 1      | mg/L            | 219               | 44                | 16                | 69                | 28                |
| EG020F: Dissolved Metals by ICP-MS       |                 |        |                 |                   |                   |                   |                   |                   |
| Manganese                                | 7439-96-5       | 0.001  | mg/L            | 0.106             | 0.022             | 0.094             | 0.679             | 0.508             |
| Iron                                     | 7439-89-6       | 0.05   | mg/L            | 8.16              | <0.05             | 1.70              | 0.32              | 6.52              |
| EK040P: Fluoride by PC Titrator          |                 |        |                 |                   |                   |                   |                   |                   |
| Fluoride                                 | 16984-48-8      | 0.1    | mg/L            | 0.5               | 0.2               | 0.1               | 0.4               | 0.2               |
| EK055G: Ammonia as N by Discrete Anal    | yser            |        |                 |                   |                   |                   |                   |                   |
| Ammonia as N                             | 7664-41-7       | 0.01   | mg/L            | 345               | 8.51              | 1.62              | 124               | 3.74              |
| EK057G: Nitrite as N by Discrete Analyse | er              |        |                 |                   |                   |                   |                   |                   |
| Nitrite as N                             | 14797-65-0      | 0.01   | mg/L            | <0.01             | 0.27              | 0.01              | <0.01             | <0.01             |
| EK058G: Nitrate as N by Discrete Analys  | er              |        |                 |                   |                   |                   |                   |                   |
| Nitrate as N                             | 14797-55-8      | 0.01   | mg/L            | <0.01             | 2.39              | 0.01              | <0.01             | 0.01              |
| EK059G: Nitrite plus Nitrate as N (NOx)  | ov Discrete Ana | lvser  |                 |                   |                   |                   |                   |                   |
| Nitrite + Nitrate as N                   |                 | 0.01   | mg/L            | <0.01             | 2.66              | 0.02              | <0.01             | 0.01              |
| EP005: Total Organic Carbon (TOC)        |                 |        |                 |                   |                   |                   |                   |                   |
| Total Organic Carbon                     |                 | 1      | mg/L            | 203               | 17                | 14                | 79                | 21                |
|  |                 |        |                 |                   |                   |                   |                   |                   |



| Sub-Matrix: WATER<br>(Matrix: WATER)  |            |                 | Sample ID      | BH1C              | BH3               | BH4               | BH9               | BH12R             |
|---------------------------------------|------------|-----------------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                                       |            | Sampli          | ng date / time | 05-Dec-2022 09:30 | 05-Dec-2022 12:55 | 05-Dec-2022 13:45 | 05-Dec-2022 08:35 | 05-Dec-2022 11:50 |
| Compound                              | CAS Number | Number LOR Unit |                | EW2205534-001     | EW2205534-002     | EW2205534-003     | EW2205534-004     | EW2205534-005     |
|                                       |            |                 |                | Result            | Result            | Result            | Result            | Result            |
| QWI-EN 67.11 Sampling of Groundwaters |            |                 |                |                   |                   |                   |                   |                   |
| Standing Water Level                  |            | 0.01            | m AHD          | 3.00              | 3.01              | 4.24              | 2.94              | 4.15              |



| Composite         Concent   | Sub-Matrix: WATER<br>(Matrix: WATER)         |                 |        | Sample ID       | BH13              | BH14              | BH15              | BH19R             | BH18              |
|---|--|-----------------|--------|-----------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Company<br>Constraints<br>Constraints<br>Constraints<br>  |  |                 | Sampli | ing date / time | 05-Dec-2022 12:10 | 05-Dec-2022 12:30 | 05-Dec-2022 11:15 | 05-Dec-2022 13:20 | 05-Dec-2022 10:50 |
| RADSPD: Flaid ConductivityResult  | Compound                                     | CAS Number      | LOR    | Unit            | EW2205534-006     | EW2205534-007     | EW2205534-008     | EW2205534-009     | EW2205534-010     |
| PL         PL<  |  |                 |        |                 | Result            | Result            | Result            | Result            | Result            |
| pH          0.1         pH uh         7.3         7.0         7.4         8.4         7.2           EAJ9ED: Felo Conductivity (Non          1         µSton         1770         756         2650         724         880           EAH16: Temperature  | EA005FD: Field pH                            |                 |        |                 |                   |                   |                   |                   |                   |
| EAADBCP: Field Conductivity (Ixon 1         I jiSom         1770         756         2650         724         880           Compensated)           1770         756         2650         724         880           EAHTS: Tomperature           0.5         °C         20.3         19.7         18.2         17.6         18.3           ED037F: Alkalinity as CACO3         DMO:210.001         1         mgl.         <1   | рН   |                 | 0.1    | pH Unit         | 7.3               | 7.0               | 7.4               | 8.4               | 7.2               |
| Electrical Conductivity (Non         1         μ S/cm         1770         786         280         724         880           EA 145: Temperature  | EA010FD: Field Conductivity                  |                 |        |                 |                   |                   |                   |                   |                   |
| EA115 ramperature   | Electrical Conductivity (Non<br>Compensated) |                 | 1      | μS/cm           | 1770              | 756               | 2650              | 724               | 880               |
| Temperature         ···         0.5         °C         20.3         19.7         18.2         17.6         18.3           ED037P: Alkalinity by C Titrator         ····         ····         ····         ····           Hydroxide Akalinity as CaCO3         3812 32.6         1         mg/L         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1<         <1<         <1<         <1<         <1<         <1<         <1<         <1<         <1<         <1<         <1<         <1<         <1<         <1<         <1<         <1<         <1<         <1<         <1<         <1<         <1<         <1<         <1<         <1<         <1<         <1<         <1<         <1<         <1<         <1<         <1<         <1<         <1<         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1 <th< td=""><td>EA116: Temperature</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>   | EA116: Temperature                           |                 |        |                 |                   |                   |                   |                   |                   |
| ED037P: Alkalinity by PC Tritetor           Mydroxife Akalinity by PC Tritetor           Mydroxife Akalinity as CaC03         DMO-210-001         1         mg/L         <1         <1         <1         <1         <1           Garbonate Akalinity as CaC03         SB12-226         1         mg/L         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1         <1   | Temperature                                  |                 | 0.5    | °C              | 20.3              | 19.7              | 18.2              | 17.6              | 18.3              |
| Hydroxide Alkalinity as CaCO3         DMO(21001)         1         mg/L <f1< th=""> <f1< th=""> <f1< th=""> <f1< th=""> <f1< th="">           Carbonate Alkalinity as CaCO3         3812.32.6         1         mg/L         779         334         4677         287          <f1< td="">           Total Alkalinity as CaCO3         7.162.3         1         mg/L         779         334         4677         287           <f1< td=""> <f1< td=""></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<></f1<>  | ED037P: Alkalinity by PC Titrator            |                 |        |                 |                   |                   |                   |                   |                   |
| Carbonate Alkalinity as CaCO3         381 2.26         1         mg/L         <1         <1         <1         <1         <1           Blearbonate Alkalinity as CaCO3         71.8 2.3         1         mg/L         779         334         467         287         458           Total Alkalinity as CaCO3          1         mg/L         779         334         467         287         458           EDM43C: Churbidimetric) as SO42- by DA   | Hydroxide Alkalinity as CaCO3                | DMO-210-001     | 1      | mg/L            | <1                | <1                | <1                | <1                | <1                |
| Bicarbonate Alkalinity as CaCO3         71-9.2.3         1         mg/L         779         334         467         287         458           Total Alkalinity as CaCO3          1         mg/L         779         334         467         287         458           Total Alkalinity as CaCO3          1         mg/L         779         334         467         287         458           Boular Sculate (Turbulimetric as SO4 - 2 by DA              458            Boular Sculate (Turbulimetric 14808-79-8         1         mg/L         64         80         534         53         12           ED045C: Choride by Discrete Analyser                   Choride by Discrete Analyser                                     .  | Carbonate Alkalinity as CaCO3                | 3812-32-6       | 1      | mg/L            | <1                | <1                | <1                | <1                | <1                |
| Total Akalinity as CaC03          1         mg/L         779         334         467         287         448           ED041G: Sulfate (Turbidimetric) as S04 2· by DA          mg/L         640         680         534         53         12           ED045G: Chloride by Discrete Analyser          mg/L         640         33         447         53         12           ED045G: Chloride by Discrete Analyser          mg/L         204         33         447         53         76           ED095F: Discolved Major Catlons         mg/L         740,070-2         1         mg/L         185         82         131         75         87           Edclum         740,070-2         1         mg/L         185         82         131         75         87           Edclum         740,070-2         1         mg/L         0.320         0.082         0.311         0.068         0.078           Ed020F: Discolved Metals by ICP-MS         mg/L         0.320         0.082         0.311         0.068         0.02         0.2         0.2           EK040P: Fluoride by DC Titator          mg/L         0.32         0.66         0.2         0.2         0.2  | Bicarbonate Alkalinity as CaCO3              | 71-52-3         | 1      | mg/L            | 779               | 334               | 467               | 287               | 458               |
| ED0416: Sulfate (Turbidimetric) as SO4 2- by DA           Sulfate as SO4 - Turbidimetric         14808-79-8         1         mg/L         64         80         534         53         12           ED0456: Chloride by Discrete Analyser         C         C         C         C         C         C           Chloride and Callone         1         mg/L         204         33         447         52         76           ED0957: Dissolved Major Cations   | Total Alkalinity as CaCO3                    |                 | 1      | mg/L            | 779               | 334               | 467               | 287               | 458               |
| Sulfate as SQ4 - Turbidimetric         14808-79-8         1         mg/L         64         80         534         63         12           ED045G: Chloride by Discrete Analyser         -<   | ED041G: Sulfate (Turbidimetric) as SO4 2     | - by DA         |        |                 |                   |                   |                   |                   |                   |
| BO0450: Chloride by Discrete Analyser           Chloride by Discrete Analyser           Chloride by Discrete Analyser           BO0436: Chloride by CP-MS           BO0436: Chloride by ICP-MS   | Sulfate as SO4 - Turbidimetric               | 14808-79-8      | 1      | mg/L            | 64                | 80                | 534               | 53                | 12                |
| Chloride         16887-00-6         1         mg/L         204         33         447         52         76           ED037: Dissolved Major Cations  | ED045G: Chloride by Discrete Analyser        |                 |        |                 |                   |                   |                   |                   |                   |
| Vertications           Calcium         7440-70-2         1         mg/L         185         82         131         75         87           Potassium         7440-00-7         1         mg/L         17         14         185         37         87           Potassium         7440-00-7         1         mg/L         17         14         185         37         87           CG020F: Dissolved Metals by ICP-MS         Colspan="2">Colspan="2"           EKO40P: Fluoride by PC Titrator         Fluoride 16984-48-8         O.01         mg/L         0.2         0.6         0.2         0.2         0.2         0.2           EKO5SC: Animonia as N by Discrete Analyser         U         Mg/L         0.03         0.01         0.01 <h></h> Col1 <h></h> Co  | Chloride                                     | 16887-00-6      | 1      | mg/L            | 204               | 33                | 447               | 52                | 76                |
| Calcium         7440-70-2         1         mg/L         185         82         131         75         87           Potassium         7440-09-7         1         mg/L         17         14         185         37         18           EG020F: Dissolved Metals by ICP-MS         U         U         185         0.01         180           Manganese         7439-09-5         0.001         mg/L         0.320         0.082         0.311         0.068         0.078           Iron         7439-09-6         0.05         mg/L         0.320         0.082         0.311         0.068         0.078           EK040P: Fluoride by PC Titrator         U         U         0.32         0.07         0.02         0.97         1.85           Fluoride as N by Discrete Analyser         U         mg/L         3.32         0.66         0.2         0.2         0.2         0.2           Kotise as N by Discrete Analyser         U         3.32         0.93         0.01         0.01         0.01         0.01         0.01           Kotise as N by Discrete Analyser         U         Margina M         0.91         0.19         0.19         0.01         0.01         0.01           Kotises: Nitrate   | ED093F: Dissolved Major Cations              |                 |        |                 |                   |                   |                   |                   |                   |
| Potassium         7440-09-7         1         mg/L         17         14         185         37         18           EG020F: Dissolved Metals by ICP-MS               18           Manganese         7439-86-5         0.01         mg/L         0.320         0.082         0.311         0.068         0.078           Iron         7439-86-5         0.01         mg/L         0.320         0.082         0.311         0.068         0.078           Iron         7439-86-5         0.01         mg/L         0.320         0.062         0.311         0.068         0.078           Etodator         Use         Use         Use         Use         0.02         0.078         0.078         0.078           Fluoride by PC Titrator         Use         Use         0.07         0.078         0.078         0.07         0.02         0.2<  | Calcium                                      | 7440-70-2       | 1      | mg/L            | 185               | 82                | 131               | 75                | 87                |
| EG020F: Dissolved Metals by ICP-MS           Manganese         7439-96-5         0.001         mg/L         0.320         0.082         0.311         0.068         0.078           Iron         7439-89-6         0.05         mg/L         1.82         0.07         10.2         0.97         1.85           EK040P: Fluoride by PC Titrator         u         u         0.2         0.3         0.01         0.01         0.01         0.01         0.01         0.01         0.01         0.01         0.01         0.01         0.01         0  | Potassium                                    | 7440-09-7       | 1      | mg/L            | 17                | 14                | 185               | 37                | 18                |
| Manganese         7439-96-5         0.001         mg/L         0.320         0.082         0.311         0.068         0.078           Iron         7439-89-6         0.05         mg/L         1.82         0.07         10.2         0.97         1.85           EK040P: Fluoride by PC Titrator             0.02         0.97         1.85           EK040P: Fluoride by PC Titrator             0.02         0.66         0.2         0.2         0.2           Fluoride         1998-44-8         0.1         mg/L         0.2         0.66         0.2         0.2         0.2           EK055G: Ammonia as N by Discrete Analyser               0.131         0.2         0.2         0.2           K055G: Ammonia as N by Discrete Analyser  <  | EG020F: Dissolved Metals by ICP-MS           |                 |        |                 |                   |                   |                   |                   |                   |
| Iron7439-89-60.05mg/L1.820.0710.20.971.85EK040P: Fluoride by PC TitratorFluoride16984-48-80.1mg/L0.20.60.20.20.2Fluoride in the second | Manganese                                    | 7439-96-5       | 0.001  | mg/L            | 0.320             | 0.082             | 0.311             | 0.068             | 0.078             |
| EK040P: Fluoride by PC TitratorFluoride16984-48-80.1mg/L0.20.20.2EK055G: Ammonia as N by Discrete AnalyserAmmonia as N7664-41.70.01mg/L3.320.9310.32.351.51EK057G: Nitrite as N by Discrete AnalyserNitrite as N14797-65-00.01mg/L0.030.01<0.01   | Iron   | 7439-89-6       | 0.05   | mg/L            | 1.82              | 0.07              | 10.2              | 0.97              | 1.85              |
| Fluoride16984-48-80.1mg/L0.20.60.20.20.2EK055G: Anmonia as N by Discrete AnalyserAmmonia as N7664-41-70.01mg/L3.320.9310.32.351.51EK057G: Nitrite as N by Discrete AnalyserNitrite as N14797-65-00.01mg/L0.030.01<0.01  | EK040P: Fluoride by PC Titrator              |                 |        |                 |                   |                   |                   |                   |                   |
| EK055G: Anmonia as N by Discrete AnalyserAmmonia as N7664-41-70.01mg/L3.320.9310.32.351.51EK057G: Nitrite as N by Discrete AnalyserNitrite as N14797-65-00.01mg/L0.030.01<0.01  | Fluoride                                     | 16984-48-8      | 0.1    | mg/L            | 0.2               | 0.6               | 0.2               | 0.2               | 0.2               |
| Ammonia as N         7664-41-7         0.01         mg/L         3.32         0.93         10.3         2.35         1.51           EK057G: Nitrite as N by Discrete Analyser         14797-65-0         0.01         mg/L         0.03         0.01         <0.01         0.01         <0.01           EK058G: Nitrate as N by Discrete Analyser         0.01         mg/L         0.03         0.01         <0.01         0.01         <0.01         <0.01           EK058G: Nitrate as N by Discrete Analyser         0.01         mg/L         0.19         1.57         0.14         <0.01         <0.01         <0.01           EK059G: Nitrite plus Nitrate as N (NOX) by Discrete Analyser         0.01         mg/L         0.22         1.58         0.14         <0.01         <0.01         <0.01           EK059G: Nitrite plus Nitrate as N (NOX) by Discrete Analyser         0.01         mg/L         0.23         1.58         0.14         <0.01         <0.01         <0.01           EV051: Total Organic Carbon (TOC)         Total Organic Carbon (  | EK055G: Ammonia as N by Discrete Analy       | yser            |        |                 |                   |                   |                   |                   |                   |
| EK057C: Nitrite as N by Discrete AnalyserNitrite as N14797-65-00.01mg/L0.030.01<0.01  | Ammonia as N                                 | 7664-41-7       | 0.01   | mg/L            | 3.32              | 0.93              | 10.3              | 2.35              | 1.51              |
| Nitrite as N14797-65-00.01mg/L0.030.01<0.01<0.01<0.01EK058G: Nitrate as N by Discrete AnalyserNitrate as N14797-55-80.01mg/L0.191.570.14<0.01<0.01EK059G: Nitrite plus Nitrate as N (NOX) by Discrete AnalyserNitrite + Nitrate as N0.01mg/L0.221.580.14<0.01<0.01<0.01EP005: Total Organic Carbon (TOC)Total Organic Carbon1mg/L2318371922   | EK057G: Nitrite as N by Discrete Analyse     | er              |        |                 |                   |                   |                   |                   |                   |
| EK058G: Nitrate as N by Discrete AnalyserNitrate as N14797-55-80.01mg/L0.191.570.14<0.01  | Nitrite as N                                 | 14797-65-0      | 0.01   | mg/L            | 0.03              | 0.01              | <0.01             | 0.01              | <0.01             |
| Nitrate as N         14797-55-8         0.01         mg/L         0.19         1.57         0.14         <0.01         <0.01           EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser         service   | EK058G: Nitrate as N by Discrete Analyse     | er              |        |                 |                   |                   |                   |                   |                   |
| EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser           Nitrite + Nitrate as N          0.01         mg/L         0.22         1.58         0.14         <0.01         <0.01           EP005: Total Organic Carbon (TOC)         Total Organic Carbon          1         mg/L         23         18         37         19         22   | Nitrate as N                                 | 14797-55-8      | 0.01   | mg/L            | 0.19              | 1.57              | 0.14              | <0.01             | <0.01             |
| Nitrite + Nitrate as N          0.01         mg/L         0.22         1.58         0.14         <0.01         <0.01           EP005: Total Organic Carbon (TOC)         Total Organic Carbon          1         mg/L         23         18         37         19         22  | EK059G: Nitrite plus Nitrate as N (NOx) t    | by Discrete Ana | lyser  |                 |                   |                   |                   |                   |                   |
| EP005: Total Organic Carbon (TOC)           Total Organic Carbon         1         mg/L         23         18         37         19         22  | Nitrite + Nitrate as N                       |                 | 0.01   | mg/L            | 0.22              | 1.58              | 0.14              | <0.01             | <0.01             |
| Total Organic Carbon          1         mg/L         23         18         37         19         22   | EP005: Total Organic Carbon (TOC)            |                 |        |                 |                   |                   |                   |                   |                   |
|   | Total Organic Carbon                         |                 | 1      | mg/L            | 23                | 18                | 37                | 19                | 22                |



| Sub-Matrix: WATER<br>(Matrix: WATER)  |            |                   | Sample ID      | BH13              | BH14              | BH15              | BH19R             | BH18              |
|---------------------------------------|------------|-------------------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                                       |            | Sampli            | ng date / time | 05-Dec-2022 12:10 | 05-Dec-2022 12:30 | 05-Dec-2022 11:15 | 05-Dec-2022 13:20 | 05-Dec-2022 10:50 |
| Compound                              | CAS Number | S Number LOR Unit |                | EW2205534-006     | EW2205534-007     | EW2205534-008     | EW2205534-009     | EW2205534-010     |
|                                       |            |                   |                | Result            | Result            | Result            | Result            | Result            |
| QWI-EN 67.11 Sampling of Groundwaters |            |                   |                |                   |                   |                   |                   |                   |
| Standing Water Level                  |            | 0.01              | m AHD          | 4.11              | 4.53              | 0.73              | 4.53              | 1.97              |



| Sub-Matrix: WATER<br>(Matrix: WATER)         |                 |        | Sample ID      | BH21              | BH22              | Duplicate         | <br> |
|--|-----------------|--------|----------------|-------------------|-------------------|-------------------|------|
|  |                 | Sampli | ng date / time | 05-Dec-2022 10:20 | 05-Dec-2022 09:55 | 05-Dec-2022 08:35 | <br> |
| Compound                                     | CAS Number      | LOR    | Unit           | EW2205534-011     | EW2205534-012     | EW2205534-013     | <br> |
|  |                 |        |                | Result            | Result            | Result            | <br> |
| EA005FD: Field pH                            |                 |        |                |                   |                   |                   |      |
| рН   |                 | 0.1    | pH Unit        | 7.3               | 8.1               | 7.3               | <br> |
| EA010FD: Field Conductivity                  |                 |        |                |                   |                   |                   |      |
| Electrical Conductivity (Non<br>Compensated) |                 | 1      | µS/cm          | 2560              | 1910              | 3580              | <br> |
| EA116: Temperature                           |                 |        |                |                   |                   |                   |      |
| Temperature                                  |                 | 0.5    | °C             | 20.9              | 17.3              | 18.7              | <br> |
| ED037P: Alkalinity by PC Titrator            |                 |        |                |                   |                   |                   |      |
| Hydroxide Alkalinity as CaCO3                | DMO-210-001     | 1      | mg/L           | <1                | <1                | <1                | <br> |
| Carbonate Alkalinity as CaCO3                | 3812-32-6       | 1      | mg/L           | <1                | <1                | <1                | <br> |
| Bicarbonate Alkalinity as CaCO3              | 71-52-3         | 1      | mg/L           | 834               | 606               | 1820              | <br> |
| Total Alkalinity as CaCO3                    |                 | 1      | mg/L           | 834               | 606               | 1820              | <br> |
| ED041G: Sulfate (Turbidimetric) as SO4 2     | 2- by DA        |        |                |                   |                   |                   |      |
| Sulfate as SO4 - Turbidimetric               | 14808-79-8      | 1      | mg/L           | 149               | 283               | <10               | <br> |
| ED045G: Chloride by Discrete Analyser        |                 |        |                |                   |                   |                   |      |
| Chloride                                     | 16887-00-6      | 1      | mg/L           | 429               | 235               | 390               | <br> |
| ED093F: Dissolved Major Cations              |                 |        |                |                   |                   |                   |      |
| Calcium                                      | 7440-70-2       | 1      | mg/L           | 131               | 94                | 177               | <br> |
| Potassium                                    | 7440-09-7       | 1      | mg/L           | 18                | 43                | 68                | <br> |
| EG020F: Dissolved Metals by ICP-MS           |                 |        |                |                   |                   |                   |      |
| Manganese                                    | 7439-96-5       | 0.001  | mg/L           | 0.562             | 0.021             | 0.670             | <br> |
| Iron   | 7439-89-6       | 0.05   | mg/L           | 0.13              | 0.12              | 0.31              | <br> |
| EK040P: Fluoride by PC Titrator              |                 |        |                |                   |                   |                   |      |
| Fluoride                                     | 16984-48-8      | 0.1    | mg/L           | 0.4               | 0.4               | 0.3               | <br> |
| EK055G: Ammonia as N by Discrete Ana         | lyser           |        |                |                   |                   |                   |      |
| Ammonia as N                                 | 7664-41-7       | 0.01   | mg/L           | 4.92              | 55.8              | 119               | <br> |
| EK057G: Nitrite as N by Discrete Analys      | er              |        |                |                   |                   |                   |      |
| Nitrite as N                                 | 14797-65-0      | 0.01   | mg/L           | <0.01             | <0.01             | <0.01             | <br> |
| EK058G: Nitrate as N by Discrete Analys      | ser             |        |                |                   |                   |                   |      |
| Nitrate as N                                 | 14797-55-8      | 0.01   | mg/L           | <0.01             | 0.01              | <0.01             | <br> |
| EK059G: Nitrite plus Nitrate as N (NOx)      | by Discrete Ana | lyser  |                |                   |                   |                   |      |
| Nitrite + Nitrate as N                       |                 | 0.01   | mg/L           | <0.01             | 0.01              | <0.01             | <br> |
| EP005: Total Organic Carbon (TOC)            |                 |        |                |                   |                   |                   |      |
| Total Organic Carbon                         |                 | 1      | mg/L           | 41                | 34                | 80                | <br> |



| Sub-Matrix: WATER<br>(Matrix: WATER)  |            |          | Sample ID      | BH21              | BH22              | Duplicate         | <br> |
|---------------------------------------|------------|----------|----------------|-------------------|-------------------|-------------------|------|
|                                       |            | Sampli   | ng date / time | 05-Dec-2022 10:20 | 05-Dec-2022 09:55 | 05-Dec-2022 08:35 | <br> |
| Compound                              | CAS Number | LOR Unit |                | EW2205534-011     | EW2205534-012     | EW2205534-013     | <br> |
|                                       |            |          |                | Result            | Result            | Result            | <br> |
| QWI-EN 67.11 Sampling of Groundwaters |            |          |                |                   |                   |                   |      |
| Standing Water Level                  |            | 0.01     | m AHD          | 2.98              | 2.77              | 3.94              | <br> |

#### Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) EK055G: Ammonia as N by Discrete Analyser

(WATER) EG020F: Dissolved Metals by ICP-MS

(WATER) EK057G: Nitrite as N by Discrete Analyser

(WATER) EK058G: Nitrate as N by Discrete Analyser

(WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser

(WATER) ED045G: Chloride by Discrete Analyser

(WATER) ED037P: Alkalinity by PC Titrator

(WATER) EK040P: Fluoride by PC Titrator

(WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA

(WATER) ED093F: Dissolved Major Cations

(WATER) EP005: Total Organic Carbon (TOC)

#### CHAIN OF CUSTODY Sydney: 277 Woodpark Rd, Smithfield NSW 2176 Ph: 02 8784 8555 Etsamples.sydney@alsenviro.com

ALS Laboratory: please tick ->

C Brisbane: 32 Shand St. Slafford QLD 4053 Ph:07 3243 7222 Esamples brisbane@alsenviro.com El Newcastle: 5 Rosegum Rd, Warabrook NSW 2304 El Townsville: 14-15 Desma Ct, Bohle QLD 4818 Ph:02 4968 9433 E:samples.newcaslle@alseriviro.com Ph:07 4796 0600 E: :ownsville.environmental@alsenviro.com

C Melbourne: 2-4 Westall Rd. Springvale VIC 3171 Ph:03 8549 9600 E: samples.melbourne@alsenvizy.com El Adelaide: 2-1 Burna Rd, Popraka SA 5095 Ph: 08 8359 0890 E:adelaide@alsenviro.com

E Perth: 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsenviro.com El Launceston: 27 Wellington St. Launceston TAS 7250 Phr 03 6331 2158 E: launceston@alsenviro.com

| CLIENT:                | Shellharbour City Council                    |                                   | TURNAROUND REQUIREMENTS :      Standard TAT (List due date): |  |                       |                      |                    |                                |                          |                        |                                    | FOF                                | LABORATOR  | YUSE ONLY (Circle)   |
|------------------------|--|-----------------------------------|--|--|-----------------------|----------------------|--------------------|--------------------------------|--------------------------|------------------------|------------------------------------|------------------------------------|--|--|
| OFFICE:                | 41 Burelli St WOLLONGONG NSW                 | 2500                              | (Standard T/<br>e.g., Ultra Tr                               | AT may be longer for some tests<br>ace Organics) | Non S                 | tandard or urg       | ent TAT (Lis       | t due dat                      | e):                      |                        | <u>-</u>                           | Cust                               | ody Seal Intact?                                     | No No  |
| PROJECT:               | Dunmore Quarterly Surface Waters             | s EPL                             | ALS QUO  | TE NO.: WO/030/19 TENDE                          | ER                    |                      |                    |                                | COC SEQ                  | JENCE NUME             | BER (Circle                        | ) Free                             | ike/frozen loe brid<br>pl?                           | cka present upon ves) No N/  |
| ORDER NUMBER:          | A  |                                   |  |  |                       |                      |                    | CO0                            | C: 1 2                   | 34                     | 56                                 | 7 Rom                              | iom Sampic Temp                                      | élature on Réceipt   |
| PROJECT MANAGER:       | Ryan Stirling                                | <u> </u>                          |  |  |                       |                      |                    | OF                             | 1 2                      | 34                     | 56                                 | 7 One                              | r comment  | D.C.   |
| SAMPLER:               | bert Dalib                                   | SAMPLER N                         | NOBILE:  |  |                       | SHED BY:             | <b>.</b>           | RE                             | CEIVED BY:               | ~ <b>!</b>             |                                    | RELINQU                            | ISHED BY:  | RECEIVED BY:   |
| COC emailed to ALS?    | (YES / NO)                                   | EDD FORM                          | AT (or defau   | ilt):  | 1.60                  | e-+ 1                | Jar 10             | >                              | Anet                     | -e <sub>j</sub>        |                                    |                                    |  |  |
| Email Reports to :     |  | w =                               |  |  | DATE/TIME             | ≞<br>>lia            |                    | DA                             | fe/TIME:<br>クレッル         | 07.                    |                                    | DATE/TIM                           | IE:  | DATE/TIME:   |
| Email Invoice to :     | · · · · · · · · · · · · · · · · · · ·        |                                   |  |  | 211.                  | -1                   |                    |                                | 414                      | 11                     |                                    |                                    |  |  |
| COMMENTS/SPECIAL       | HANDLING/STORAGE OR DISPOSA                  | AL: CC reports to                 | :  |  |                       |                      |                    |                                |                          |                        |                                    |                                    |  |  |
| ALS USE ONLY           | SAMPLI<br>MATRIX: So                         | E DETAILS<br>blid(S) Water(W)     |  | CONTAINER INFO                                   | ORMATION              |                      | ANALYSI<br>Where M | S REQU                         | IRED includi             | ing SUITES             | (NB. Suite Co<br>ottle required) o | odes must be l<br>r Dissolved (fie | isted to attract suite<br>Id filtered bottle require | e price)<br>Additional Information   |
| LAB ID                 | SAMPLE ID                                    | DATE / TIME                       | MATRIX   | TYPE & PRESERVAT<br>(refer to codes below        | IVE<br>v)             | TOTAL<br>BOTTLES     | TSS                | NT-1, NT-2A<br>(Ionic Balance) | TOC, NT-4, NH3, Total Mn | Dissolved and Total Fe | Turbidity                          | NH3, NH4 & NO3                     | TSS, TDS, TOC, Total Mn                              | Comments on likely contaminant levels,<br>dilutions, or samples requiring specific QC<br>analysis etc. |
|                        | SWP1 2                                       | 12.22 11:35                       | ₹ w  |  |                       |                      | ·                  |                                | · ·                      | -                      |                                    |                                    |  | Field Tests - pH, EC, DO & Temp  |
|                        | SWC_2  | G '55                             | ; w  |  |                       |                      |                    | ✓                              |                          | 1                      | . 🖌                                | 1                                  | ~  | Field Tests - pH, EC, DO & Temp  |
|                        | SWC_UP                                       | 8.5                               | , w  |  |                       |                      |                    | 1                              |                          | 1                      | 1                                  | 1                                  | 1  | Field Tests - pH, EC, DO & Temp  |
|                        | SWC_DOWN                                     | 9:00                              | , w  |  |                       |                      |                    | ✓                              |                          | 1                      | 1                                  | 1                                  | 1  | Field Tests - pH, EC, DO & Temp  |
|                        | SWC_DOWN_2                                   | 9:15                              | s w  | · · · ·  |                       |                      |                    | 1                              |                          | 1                      | 1                                  | 1                                  | 1  | Field Tests - pH, EC, DO & Temp  |
|                        | Duplicate                                    | 9:55                              | w  |  |                       |                      |                    | 1                              |                          | 1                      | 1                                  | 1                                  | · ·  | Field Tests - pH, EC, DO & Temp  |
| Water Container Codes: | P = Unpreserved Plastic; N = Nitric Preserve | ed Plastic; ORC = Nitric Preserve | d ORC: SH =  | Sodum Hydroxide/Cd Preserved; S                  | TOTAL<br>S = Sodium H | 10<br>ydroxide Prese | ved Plastic; A     | G = Ambei                      | r Glass Unpres           | erved; AP - Al         |                                    | eserved Plastic                    | Envi<br>Woll<br>W                                    | ironmental Division<br>longong<br>ork Order Reference<br>W2205529                                      |

Telephone : 02 42253125



# **CERTIFICATE OF ANALYSIS**

| Work Order              | EW2205529                                     | Page                    | : 1 of 7   |
|-------------------------|---|-------------------------|--|
| Client                  | SHELLHARBOUR CITY COUNCIL                     | Laboratory              | Environmental Division NSW South Coast                     |
| Contact                 | : Ryan Stirling                               | Contact                 | : Aneta Prosaroski   |
| Address                 | : LAMERTON HOUSE, LAMERTON CRESCENT           | Address                 | : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia |
|                         | SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529 |                         |  |
| Telephone               | :   | Telephone               | : +61 2 4225 3125  |
| Project                 | : Dunmore Quarterly Surface Water EPL         | Date Samples Received   | : 02-Dec-2022 14:55  |
| Order number            | : 147649                                      | Date Analysis Commenced | : 02-Dec-2022  |
| C-O-C number            | :   | Issue Date              | : 09-Dec-2022 17:53  |
| Sampler                 | : Robert DaLio                                |                         | Hac-MRA NATA   |
| Site                    | : DUNMORE LANDFILL TENDER                     |                         |  |
| Quote number            | : WO/030/19 TENDER SURFACE WATER              |                         | Accorditation No. 925                                      |
| No. of samples received | : 6   |                         | Accredited for compliance with                             |
| No. of samples analysed | : 6   |                         | ISO/IEC 17025 - Testing                                    |

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

#### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| Signatories      | Position                              | Accreditation Category             |
|------------------|---------------------------------------|------------------------------------|
| Aneta Prosaroski | Environmental Services Representative | Laboratory - Wollongong, NSW       |
| Ankit Joshi      | Senior Chemist - Inorganics           | Sydney Inorganics, Smithfield, NSW |



#### **General Comments**

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- Analytical work for this work order will be conducted at ALS Sydney.
- As per QWI EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions Chloride, Alkalinity and Sulfate; and Major Cations Calcium, Magnesium, Potassium and Sodium.
   Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- TDS by method EA-015 may bias high for sample 5 due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.6 Rivers and Streams.
- Temperature performed by ALS Wollongong via in-house method EA116 and EN67 PK.
- Dissolved oxygen (DO) performed by ALS Wollongong via in-house method EA025FD and EN67 PK.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.4 Lakes and Reservoirs
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.</li>



| Sub-Matrix: WATER<br>(Matrix: WATER)         | Sample ID   |        | SWP1<br>Point 1 | SWC_2<br>Point 19 | SWC_UP<br>Point 20 | SWC_Down<br>Point 21 | SWC_DOWN_2<br>Point 22 |                   |
|--|-------------|--------|-----------------|-------------------|--------------------|----------------------|------------------------|-------------------|
|  |             | Sampli | ng date / time  | 02-Dec-2022 11:35 | 02-Dec-2022 09:55  | 02-Dec-2022 08:50    | 02-Dec-2022 09:00      | 02-Dec-2022 09:15 |
| Compound                                     | CAS Number  | LOR    | Unit            | EW2205529-001     | EW2205529-002      | EW2205529-003        | EW2205529-004          | EW2205529-005     |
|  |             |        |                 | Result            | Result             | Result               | Result                 | Result            |
| EA005FD: Field pH                            |             |        |                 |                   |                    |                      |                        |                   |
| рН   |             | 0.1    | pH Unit         | 7.5               | 7.0                | 7.0                  | 7.0                    | 7.0               |
| EA010FD: Field Conductivity                  |             |        |                 |                   |                    |                      |                        |                   |
| Electrical Conductivity (Non<br>Compensated) |             | 1      | µS/cm           | 1500              | 14100              | 17100                | 21600                  | 29100             |
| EA015: Total Dissolved Solids dried at 1     | 80 ± 5 °C   |        |                 |                   |                    |                      |                        |                   |
| Total Dissolved Solids @180°C                |             | 10     | mg/L            |                   | 9700               | 12000                | 15400                  | 23300             |
| EA025: Total Suspended Solids dried at       | 104 ± 2°C   |        |                 |                   |                    |                      |                        |                   |
| Suspended Solids (SS)                        |             | 5      | mg/L            | 14                | 10                 | <5                   | <5                     | <5                |
| EA045: Turbidity                             |             |        |                 |                   |                    |                      |                        |                   |
| Turbidity                                    |             | 0.1    | NTU             | 2.7               | 19.7               | 14.0                 | 10.7                   | 6.3               |
| EA116: Temperature                           |             |        |                 |                   |                    |                      |                        |                   |
| Temperature                                  |             | 0.5    | °C              | 19.5              | 18.7               | 19.0                 | 19.0                   | 18.7              |
| ED037P: Alkalinity by PC Titrator            |             |        |                 |                   |                    |                      |                        |                   |
| Hydroxide Alkalinity as CaCO3                | DMO-210-001 | 1      | mg/L            | <1                | <1                 | <1                   | <1                     | <1                |
| Carbonate Alkalinity as CaCO3                | 3812-32-6   | 1      | mg/L            | <1                | <1                 | <1                   | <1                     | <1                |
| Bicarbonate Alkalinity as CaCO3              | 71-52-3     | 1      | mg/L            | 464               | 141                | 150                  | 154                    | 142               |
| Total Alkalinity as CaCO3                    |             | 1      | mg/L            | 464               | 141                | 150                  | 154                    | 142               |
| ED041G: Sulfate (Turbidimetric) as SO4 2     | 2- by DA    |        |                 |                   |                    |                      |                        |                   |
| Sulfate as SO4 - Turbidimetric               | 14808-79-8  | 1      | mg/L            | 96                | 680                | 817                  | 1060                   | 1500              |
| ED045G: Chloride by Discrete Analyser        |             |        |                 |                   |                    |                      |                        |                   |
| Chloride                                     | 16887-00-6  | 1      | mg/L            | 225               | 5380               | 6620                 | 8410                   | 11200             |
| ED093F: Dissolved Major Cations              |             |        |                 |                   |                    |                      |                        |                   |
| Calcium                                      | 7440-70-2   | 1      | mg/L            | 65                | 124                | 145                  | 184                    | 242               |
| Magnesium                                    | 7439-95-4   | 1      | mg/L            | 41                | 308                | 378                  | 493                    | 678               |
| Sodium                                       | 7440-23-5   | 1      | mg/L            | 213               | 2680               | 3280                 | 4310                   | 5920              |
| Potassium                                    | 7440-09-7   | 1      | mg/L            | 20                | 101                | 122                  | 160                    | 216               |
| EG020F: Dissolved Metals by ICP-MS           |             |        |                 |                   |                    |                      |                        |                   |
| Iron   | 7439-89-6   | 0.05   | mg/L            | 0.06              | <0.05              | <0.05                | <0.05                  | <0.05             |
| EG020T: Total Metals by ICP-MS               |             |        |                 |                   |                    |                      |                        |                   |
| Manganese                                    | 7439-96-5   | 0.001  | mg/L            | 0.842             | 0.165              | 0.169                | 0.130                  | 0.114             |
| Iron   | 7439-89-6   | 0.05   | mg/L            | 0.14              | 1.20               | 0.89                 | 0.68                   | 0.48              |
| EK040P: Fluoride by PC Titrator              |             |        |                 |                   |                    |                      |                        |                   |
| Fluoride                                     | 16984-48-8  | 0.1    | mg/L            | 0.4               | 0.6                | 0.6                  | 0.7                    | 0.8               |



| Sub-Matrix: WATER<br>(Matrix: WATER)     |                  |        | Sample ID      | SWP1<br>Point 1   | SWC_2<br>Point 19 | SWC_UP<br>Point 20 | SWC_Down<br>Point 21 | SWC_DOWN_2<br>Point 22 |
|--|------------------|--------|----------------|-------------------|-------------------|--------------------|----------------------|------------------------|
|  |                  | Sampli | ng date / time | 02-Dec-2022 11:35 | 02-Dec-2022 09:55 | 02-Dec-2022 08:50  | 02-Dec-2022 09:00    | 02-Dec-2022 09:15      |
| Compound                                 | CAS Number       | LOR    | Unit           | EW2205529-001     | EW2205529-002     | EW2205529-003      | EW2205529-004        | EW2205529-005          |
|  |                  |        |                | Result            | Result            | Result             | Result               | Result                 |
| EK055G: Ammonia as N by Discrete Anal    | yser             |        |                |                   |                   |                    |                      |                        |
| Ammonia as N                             | 7664-41-7        | 0.01   | mg/L           | 8.52              | 0.53              | 0.32               | 0.58                 | 0.32                   |
| EK055G-NH4: Ammonium as N by DA          |                  |        |                |                   |                   |                    |                      |                        |
| Ammonium as N                            | 14798-03-9_N     | 0.01   | mg/L           | 8.42              | 0.53              | 0.32               | 0.58                 | 0.32                   |
| EK057G: Nitrite as N by Discrete Analyse | ər               |        |                |                   |                   |                    |                      |                        |
| Nitrite as N                             | 14797-65-0       | 0.01   | mg/L           | 0.04              | 0.01              | <0.01              | <0.01                | <0.01                  |
| EK058G: Nitrate as N by Discrete Analys  | er               |        |                |                   |                   |                    |                      |                        |
| Nitrate as N                             | 14797-55-8       | 0.01   | mg/L           | 0.02              | 0.11              | 0.10               | 0.07                 | 0.04                   |
| EK059G: Nitrite plus Nitrate as N (NOx)  | by Discrete Anal | yser   |                |                   |                   |                    |                      |                        |
| Nitrite + Nitrate as N                   |                  | 0.01   | mg/L           | 0.06              | 0.12              | 0.10               | 0.07                 | 0.04                   |
| EN055: Ionic Balance                     |                  |        |                |                   |                   |                    |                      |                        |
| Ø Total Anions                           |                  | 0.01   | meq/L          | 17.6              | 169               | 207                | 262                  | 350                    |
| Ø Total Cations                          |                  | 0.01   | meq/L          | 16.4              | 151               | 184                | 241                  | 331                    |
| ø Ionic Balance                          |                  | 0.01   | %              | 3.59              | 5.65              | 5.78               | 4.18                 | 2.80                   |
| EP005: Total Organic Carbon (TOC)        |                  |        |                |                   |                   |                    |                      |                        |
| Total Organic Carbon                     |                  | 1      | mg/L           | 30                | 9                 | 8                  | 9                    | 7                      |
| EP025FD: Field Dissolved Oxygen          |                  |        |                |                   |                   |                    |                      |                        |
| Dissolved Oxygen                         |                  | 0.01   | mg/L           | 3.43              | 5.80              | 4.94               | 7.07                 | 4.49                   |



| Sub-Matrix: WATER<br>(Matrix: WATER)         |             |        | Sample ID      | Duplicate         | <br> | <br> |
|--|-------------|--------|----------------|-------------------|------|------|
|  |             | Sampli | ng date / time | 02-Dec-2022 09:55 | <br> | <br> |
| Compound                                     | CAS Number  | LOR    | Unit           | EW2205529-006     | <br> | <br> |
|  |             |        |                | Result            | <br> | <br> |
| EA005FD: Field pH                            |             |        |                |                   |      |      |
| рН   |             | 0.1    | pH Unit        | 7.0               | <br> | <br> |
| EA010FD: Field Conductivity                  |             |        |                |                   |      |      |
| Electrical Conductivity (Non<br>Compensated) |             | 1      | µS/cm          | 14100             | <br> | <br> |
| EA015: Total Dissolved Solids dried at 1     | 80 ± 5 °C   |        |                |                   |      |      |
| Total Dissolved Solids @180°C                |             | 10     | mg/L           | 9660              | <br> | <br> |
| EA025: Total Suspended Solids dried at       | 104 ± 2°C   |        |                |                   |      |      |
| Suspended Solids (SS)                        |             | 5      | mg/L           | 10                | <br> | <br> |
| EA045: Turbidity                             |             |        |                |                   |      |      |
| Turbidity                                    |             | 0.1    | NTU            | 19.0              | <br> | <br> |
| EA116: Temperature                           |             |        |                |                   |      |      |
| Temperature                                  |             | 0.5    | °C             | 18.7              | <br> | <br> |
| ED037P: Alkalinity by PC Titrator            |             |        |                |                   |      |      |
| Hydroxide Alkalinity as CaCO3                | DMO-210-001 | 1      | mg/L           | <1                | <br> | <br> |
| Carbonate Alkalinity as CaCO3                | 3812-32-6   | 1      | mg/L           | <1                | <br> | <br> |
| Bicarbonate Alkalinity as CaCO3              | 71-52-3     | 1      | mg/L           | 132               | <br> | <br> |
| Total Alkalinity as CaCO3                    |             | 1      | mg/L           | 132               | <br> | <br> |
| ED041G: Sulfate (Turbidimetric) as SO4       | 2- by DA    |        |                |                   |      |      |
| Sulfate as SO4 - Turbidimetric               | 14808-79-8  | 1      | mg/L           | 704               | <br> | <br> |
| ED045G: Chloride by Discrete Analyser        |             |        |                |                   |      |      |
| Chloride                                     | 16887-00-6  | 1      | mg/L           | 5390              | <br> | <br> |
| ED093F: Dissolved Major Cations              |             |        |                |                   |      |      |
| Calcium                                      | 7440-70-2   | 1      | mg/L           | 127               | <br> | <br> |
| Magnesium                                    | 7439-95-4   | 1      | mg/L           | 318               | <br> | <br> |
| Sodium                                       | 7440-23-5   | 1      | mg/L           | 2750              | <br> | <br> |
| Potassium                                    | 7440-09-7   | 1      | mg/L           | 106               | <br> | <br> |
| EG020F: Dissolved Metals by ICP-MS           |             |        |                |                   |      |      |
| Iron   | 7439-89-6   | 0.05   | mg/L           | <0.05             | <br> | <br> |
| EG020T: Total Metals by ICP-MS               |             |        |                |                   |      |      |
| Manganese                                    | 7439-96-5   | 0.001  | mg/L           | 0.161             | <br> | <br> |
| Iron   | 7439-89-6   | 0.05   | mg/L           | 1.11              | <br> | <br> |
| EK040P: Fluoride by PC Titrator              |             |        |                |                   |      |      |
| Fluoride                                     | 16984-48-8  | 0.1    | mg/L           | 0.6               | <br> | <br> |



| Sub-Matrix: WATER<br>(Matrix: WATER)     |                 |         | Sample ID      | Duplicate         | <br> | <br> |
|--|-----------------|---------|----------------|-------------------|------|------|
|  |                 | Samplii | ng date / time | 02-Dec-2022 09:55 | <br> | <br> |
| Compound                                 | CAS Number      | LOR     | Unit           | EW2205529-006     | <br> | <br> |
|  |                 |         |                | Result            | <br> | <br> |
| EK055G: Ammonia as N by Discrete Anal    | yser            |         |                |                   |      |      |
| Ammonia as N                             | 7664-41-7       | 0.01    | mg/L           | 0.60              | <br> | <br> |
| EK055G-NH4: Ammonium as N by DA          |                 |         |                |                   |      |      |
| Ammonium as N                            | 14798-03-9_N    | 0.01    | mg/L           | 0.60              | <br> | <br> |
| EK057G: Nitrite as N by Discrete Analyse | ər              |         |                |                   |      |      |
| Nitrite as N                             | 14797-65-0      | 0.01    | mg/L           | 0.01              | <br> | <br> |
| EK058G: Nitrate as N by Discrete Analys  | er              |         |                |                   |      |      |
| Nitrate as N                             | 14797-55-8      | 0.01    | mg/L           | 0.11              | <br> | <br> |
| EK059G: Nitrite plus Nitrate as N (NOx)  | by Discrete Ana | lyser   |                |                   |      |      |
| Nitrite + Nitrate as N                   |                 | 0.01    | mg/L           | 0.12              | <br> | <br> |
| EN055: Ionic Balance                     |                 |         |                |                   |      |      |
| ø Total Anions                           |                 | 0.01    | meq/L          | 169               | <br> | <br> |
| Ø Total Cations                          |                 | 0.01    | meq/L          | 155               | <br> | <br> |
| Ø Ionic Balance                          |                 | 0.01    | %              | 4.47              | <br> | <br> |
| EP005: Total Organic Carbon (TOC)        |                 |         |                |                   |      |      |
| Total Organic Carbon                     |                 | 1       | mg/L           | 9                 | <br> | <br> |
| EP025FD: Field Dissolved Oxygen          |                 |         |                |                   |      |      |
| Dissolved Oxygen                         |                 | 0.01    | mg/L           | 5.81              | <br> | <br> |



#### Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) EA045: Turbidity (WATER) EP005: Total Organic Carbon (TOC) (WATER) EG020F: Dissolved Metals by ICP-MS (WATER) EG020T: Total Metals by ICP-MS (WATER) EK057G: Nitrite as N by Discrete Analyser (WATER) EK058G: Nitrate as N by Discrete Analyser (WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (WATER) EA025: Total Suspended Solids dried at 104 ± 2°C (WATER) EK055G-NH4: Ammonium as N by DA (WATER) EK055G: Ammonia as N by Discrete Analyser (WATER) EN055: Ionic Balance (WATER) ED045G: Chloride by Discrete Analyser (WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (WATER) EK040P: Fluoride by PC Titrator (WATER) ED037P: Alkalinity by PC Titrator (WATER) ED093F: Dissolved Major Cations

(WATER) EA015: Total Dissolved Solids dried at 180 ± 5 °C

CHAIN OF CUSTODY ALS Laboratory: please tick →

 Sydney: 277 Woodpark RJ, Smithfeld NSW 2178
 Brisbane: 32 Shand St, Stafford QLD 4053
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 Ph 02 4963 3433 Elsemples neurosatel@piserviro.com
 Ph.07 4796 0500 El Josando El J

C Melbourne, 2-4 Westell Rd. Springvale VIC 3174 Ph/03.8549.9600 £: samples.melbourne@alsenviro.com C Adefaide: 2-1 Burma Bd. Pooraka SA 5095 Ph 08 8359 0690 Eadelaide@aisenvirg.com

C: Paîth 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7665 E: sanisled, parth@alsonviro.com C Launceston: 27 Wellington St. Launceston TAS 7250 Ph. 03 6331 2158 El launcestori/@alsenviro.com

| CLIENT:                                | Shellharbour City Council   |                                       | TURNAR                         | OUND REQUIREMENTS :                              | Standard T                    | AT (List      | due date):   | :                            | -v. <u> </u>     |              |              |                    | FC                 | R LABORAT                 | ORY USE C      | NLY (Circle)-   |
|--|---|---------------------------------------|--------------------------------|--|-------------------------------|---------------|--------------|------------------------------|------------------|--------------|--------------|--------------------|--------------------|---------------------------|----------------|---|
| OFFICE:                                | 41 Burelli St WOLLONGONG NSW  | 2500                                  | (Standard T/<br>e.g., Ultra Tr | AT may be longer for some tests<br>ace Organics) | Non Standa                    | ard or ur     | gent TAT (L  | List due da                  | ate):            |              |              |                    | cu                 | e<br>Andy Seal Inter      | n II.          |   |
| PROJECT:                               | Dunmore Quarterly Leachate  |                                       | ALS QUO                        | TE NO.: WO/03                                    | 30/19 TENDER                  |               |              |                              | COC SE           | QUENCE       | E NUMBI      | ER (Circle         | )                  | e los / linzen ic<br>arto | e bilcke prese | milipon 📈 No NA   |
| ORDER NUMBER:                          |   |                                       |                                |  |                               |               |              | c                            | oc: 1            | 2 3          | 4            | 56                 | 7 Ra               | xiom Sample T             | emperature o   | ri Receipt  |
| PROJECT MANAGER:                       | Ryan Stirling   |                                       | _                              |  |                               | <b>-</b>      |              |                              | DF: 1            | 23           | 4            | 56                 | 7 00               | er comment                |                | 6.2   |
| SAMPLER:                               | bert Dalin  | SAMPLER M                             | OBILE:                         |  | RELINQUISHE                   | D BY:         |              | R                            | ECEIVED B        | Y:           |              | <u> </u>           | RELINQ             | JISHED BY:                |                | RECEIVED BY:  |
| COC emailed to ALS?                    | YES / NO)   | EDD FORMA                             | T (or defau                    | It):   | Rebe-                         | 4 5           | Duli         | P                            | An               | Ja           |              |                    |                    |                           |                |   |
| Email Reports to :                     |   |                                       |                                |  | DATE/TIME:                    |               | • • •        | D.                           | ATE/TIME:        | -, ,         |              |                    | DATE/TH            | <br>ME:                   |                | DATE/TIME:  |
| Email Invoice to :                     |   |                                       |                                |  | 2/12/                         | 26            |              |                              | 2/1              | 212          | -2           |                    |                    |                           |                |   |
| COMMENTS/SPECIAL                       | HANDLING/STORAGE OR DISPOSA   | AL: CC reports to:                    |                                |  |                               |               |              |                              | ,                | ,            |              |                    |                    |                           |                |   |
| ALS USE ONLY.                          | SAMPLI<br>MATRIX: Sc  | E DETAILS<br>plid(S) Water(W)         |                                |  | ORMATION                      |               | ANALY        | SIS REQU                     | JIRED inclu      | ding SU      | IITES (N     | B. Suite Co        | des must be        | listed to attract         | suite price)   | Additional Information  |
|  | ······  | T                                     |                                |  |                               |               | When         | re Metais are                | required, specif | y Total (unf | filtered bot | ttie required} o   | Dissolved (fie     | eld filtered bottle re    | quired).       |   |
| LAB ID                                 | SAMPLE ID   | DATE / TIME                           | MATRIX                         | TYPE & PRESERVAT<br>(refer to codes belov        | 'IVE TC<br>♥) BO <sup>™</sup> | DTAL<br>TTLES | umonia       | NT-2A (Alka,<br>604, Cl, Fl) | OC               |              | otal Fe & Mn | IT-4 (NO2,<br>(03) |                    |                           |                | Comments on likely contaminant levels, dilutions,<br>or samples requiring specific QC analysis etc. |
|  | Leachate Storage Tank - LP1   | 2/12/24 10:AT                         | 5 W                            | · · · · · · · · · · · · · · · · · · ·            |                               |               |              | <u>-</u> ∽L                  |                  |              | ⊢<br>✓       | _ <u>zz</u><br>√   |                    |                           |                | Field Tests - pH, EC, Temp & DO   |
|  |   | 0-1 10-1- 10-4.                       |                                |  |                               |               |              | 1                            |                  |              |              |                    |                    |                           |                | p.,,,   |
| ······                                 | · · · · · · · · · · · · · · · · · · ·   |                                       |                                |  |                               |               |              |                              |                  |              |              |                    |                    |                           |                |   |
|  |   |                                       |                                |  |                               |               |              |                              |                  |              |              |                    |                    |                           |                |   |
|  |   |                                       |                                |  |                               |               |              | 1                            |                  | -            |              |                    |                    |                           |                |   |
|  | ·····   |                                       |                                |  |                               |               |              |                              |                  | _            |              |                    |                    |                           |                |   |
| <u> </u>                               |   |                                       |                                |  |                               |               |              |                              |                  |              |              |                    |                    |                           |                |   |
|  | L   |                                       |                                |  |                               | ĺ             |              |                              |                  |              |              |                    |                    |                           |                |   |
|  |   |                                       |                                |  |                               |               |              |                              |                  |              |              | · · · · ·          |                    |                           |                |   |
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|  |   |                                       |                                |  |                               |               |              |                              |                  |              |              | _                  | •                  |                           | doloa          |   |
|  |   | · · · · · · · · · · · · · · · · · · · |                                |  |                               |               |              |                              |                  |              |              | En\                | ronm               |                           | 1510.1         |   |
|  |   |                                       |                                |  |                               |               |              |                              | _                |              |              | - ¥VO<br>- ∖       | liongo<br>Vork Öri | lig<br>der Refere         | ence           |   |
|  |   |                                       |                                |  |                               |               |              |                              |                  |              |              | İ                  |                    | 2205                      | 533            |   |
|  |   |                                       |                                |  |                               |               |              |                              |                  |              |              | - 1                |                    |                           |                |   |
| ······                                 |   |                                       |                                |  |                               |               | •            | <u> </u>                     |                  | <u> </u>     |              |                    |                    |                           |                |   |
|  |   |                                       |                                |  | ·                             |               |              | ·                            |                  |              |              | _                  |                    |                           |                |   |
|  |   |                                       |                                |  |                               |               |              |                              |                  |              |              | _                  |                    |                           |                |   |
|  |   | <u> </u>                              |                                |  |                               |               |              |                              |                  |              |              | _                  |                    |                           |                |   |
|  |   |                                       |                                |  |                               |               |              |                              |                  |              |              | Tele               | phone : 02         | 42253125                  |                |   |
| f                                      | <br> <br>   |                                       |                                |  |                               |               |              |                              |                  |              |              | _                  |                    |                           | 1              |   |
|  |   |                                       |                                |  |                               |               |              |                              |                  |              |              |                    |                    | +                         |                | · · · · · · · · · · · · · · · · · · ·   |
| Water Container Or de                  |   |                                       |                                |  | TOTAL                         | U             |              |                              |                  |              |              |                    |                    |                           |                |   |
| reter Container Codes: P               | <ul> <li>Onpreserved Plastic; N = Nitric Preserve</li> <li>VOA VERT Quality Plastic Theory</li> </ul> | ed Plastic; ORC = Nitric Preserved    | ORC; SH =                      | Sodium Hydroxide/Cd Preserved;                   | S = Sodium Hydro:             | xide Pres     | erved Plasti | с; AG = Ап                   | ber Glass Un     | preserved    | i; AP - A    | infreight Unp      | reserved Pla       | stic                      | ·              |   |

V = VOA Vial HCI Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulphate Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Pastic; H = HCI preserved Plastic; HS = HCI preserved Plastic; F = Formaldehyde Preserved Plastic; F = Formaldehyde Preserved Bag.



# **CERTIFICATE OF ANALYSIS**

| Work Order              | EW2205533                                     | Page                    | : 1 of 4   |
|-------------------------|---|-------------------------|--|
| Client                  | SHELLHARBOUR CITY COUNCIL                     | Laboratory              | Environmental Division NSW South Coast                     |
| Contact                 | : Ryan Stirling                               | Contact                 | : Aneta Prosaroski   |
| Address                 | : LAMERTON HOUSE, LAMERTON CRESCENT           | Address                 | : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia |
|                         | SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529 |                         |  |
| Telephone               |   | Telephone               | : +61 2 4225 3125  |
| Project                 | : Dunmore Quarterly Leachate Tank EPL         | Date Samples Received   | : 02-Dec-2022 14:48  |
| Order number            | : 147649                                      | Date Analysis Commenced | : 02-Dec-2022  |
| C-O-C number            | :   | Issue Date              | : 09-Dec-2022 16:39  |
| Sampler                 | : Robert DaLio                                |                         | HALA NALA  |
| Site                    | : DUNMORE LANDFILL TENDER                     |                         |  |
| Quote number            | : WO/030/19 TENDER LEACHATE                   |                         | Accorditation No. 935                                      |
| No. of samples received | : 1   |                         | Accredited for compliance with                             |
| No. of samples analysed | : 1   |                         | ISO/IEC 17025 - Testing                                    |

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

#### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| Signatories      | Position                              | Accreditation Category             |
|------------------|---------------------------------------|------------------------------------|
| Aneta Prosaroski | Environmental Services Representative | Laboratory - Wollongong, NSW       |
| Ankit Joshi      | Senior Chemist - Inorganics           | Sydney Inorganics, Smithfield, NSW |
| Wisam Marassa    | Inorganics Coordinator                | Sydney Inorganics, Smithfield, NSW |



#### **General Comments**

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

- ø = ALS is not NATA accredited for these tests.
- ~ = Indicates an estimated value.
- Analytical work for this work order will be conducted at ALS Sydney.
- EK059G: LOR raised for NOx on sample 1 due to sample matrix.
- EK057G: LOR raised for Nitrite on sample 1 due to sample matrix.
- EK058G: LOR raised for Nitrate on sample 1 due to sample matrix.
- ED041G: LOR raised for Sulfate on sample 1 due to sample matrix.
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Temperature performed by ALS Wollongong via in-house method EA116 and EN67 PK.
- Dissolved oxygen (DO) performed by ALS Wollongong via in-house method EA025FD and EN67 PK.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.10 Wastewaters
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.



| Sub-Matrix: WATER<br>(Matrix: WATER)       |                |        | Sample ID      | Leachate Storage  | <br> | <br> |
|--|----------------|--------|----------------|-------------------|------|------|
| (  |                |        |                | i ank             |      |      |
|  |                | Sampli | ng date / time | 02-Dec-2022 10:45 | <br> | <br> |
| Compound                                   | CAS Number     | LOR    | Unit           | EW2205533-001     | <br> | <br> |
|  |                |        |                | Result            | <br> | <br> |
| EA005FD: Field pH                          |                |        |                |                   |      |      |
| рН   |                | 0.1    | pH Unit        | 8.5               | <br> | <br> |
| EA010FD: Field Conductivity                |                |        |                |                   |      |      |
| Electrical Conductivity (Non               |                | 1      | µS/cm          | 9310              | <br> | <br> |
| Compensated)                               |                |        |                |                   |      |      |
| EA015: Total Dissolved Solids dried at 180 | 0 ± 5 °C       |        |                |                   |      |      |
| Total Dissolved Solids @180°C              |                | 10     | mg/L           | 5310              | <br> | <br> |
| EA116: Temperature                         |                |        |                |                   |      |      |
| Temperature                                |                | 0.1    | °C             | 19.9              | <br> | <br> |
| ED037P: Alkalinity by PC Titrator          |                |        |                |                   |      |      |
| Hydroxide Alkalinity as CaCO3              | DMO-210-001    | 1      | mg/L           | <1                | <br> | <br> |
| Carbonate Alkalinity as CaCO3              | 3812-32-6      | 1      | mg/L           | 1000              | <br> | <br> |
| Bicarbonate Alkalinity as CaCO3            | 71-52-3        | 1      | mg/L           | 2600              | <br> | <br> |
| Total Alkalinity as CaCO3                  |                | 1      | mg/L           | 3600              | <br> | <br> |
| ED041G: Sulfate (Turbidimetric) as SO4 2-  | by DA          |        |                |                   |      |      |
| Sulfate as SO4 - Turbidimetric             | 14808-79-8     | 1      | mg/L           | <100              | <br> | <br> |
| ED045G: Chloride by Discrete Analyser      |                |        |                |                   |      |      |
| Chloride                                   | 16887-00-6     | 1      | mg/L           | 1710              | <br> | <br> |
| ED093F: Dissolved Major Cations            |                |        |                |                   |      |      |
| Calcium                                    | 7440-70-2      | 1      | mg/L           | 39                | <br> | <br> |
| Potassium                                  | 7440-09-7      | 1      | mg/L           | 363               | <br> | <br> |
| EG020T: Total Metals by ICP-MS             |                |        |                |                   |      |      |
| Manganese                                  | 7439-96-5      | 0.001  | mg/L           | 0.101             | <br> | <br> |
| Iron                                       | 7439-89-6      | 0.05   | mg/L           | 1.35              | <br> | <br> |
| EK040P: Fluoride by PC Titrator            |                |        |                |                   |      |      |
| Fluoride                                   | 16984-48-8     | 0.1    | mg/L           | 0.2               | <br> | <br> |
| EK055G: Ammonia as N by Discrete Analy     | /ser           |        |                |                   |      |      |
| Ammonia as N                               | 7664-41-7      | 0.01   | mg/L           | 773               | <br> | <br> |
| EK057G: Nitrite as N by Discrete Analyse   | r              |        |                |                   |      |      |
| Nitrite as N                               | 14797-65-0     | 0.01   | mg/L           | <1.00             | <br> | <br> |
| EK058G: Nitrate as N by Discrete Analyse   | ər             |        |                |                   |      |      |
| Nitrate as N                               | 14797-55-8     | 0.01   | mg/L           | <1.00             | <br> | <br> |
| EK059G: Nitrite plus Nitrate as N (NOx) b  | y Discrete Ana | lyser  |                |                   |      |      |



| Sub-Matrix: WATER<br>(Matrix: WATER)       |                 |            | Sample ID      | Leachate Storage<br>Tank<br>LP1 | <br> | <br> |
|--|-----------------|------------|----------------|---------------------------------|------|------|
|  |                 | Sampli     | ng date / time | 02-Dec-2022 10:45               | <br> | <br> |
| Compound                                   | CAS Number      | LOR        | Unit           | EW2205533-001                   | <br> | <br> |
|  |                 |            |                | Result                          | <br> | <br> |
| EK059G: Nitrite plus Nitrate as N (NOx) to | by Discrete Ana | lyser - Co | ntinued        |                                 |      |      |
| Nitrite + Nitrate as N                     |                 | 0.01       | mg/L           | <1.00                           | <br> | <br> |
| EP005: Total Organic Carbon (TOC)          |                 |            |                |                                 |      |      |
| Total Organic Carbon                       |                 | 1          | mg/L           | 506                             | <br> | <br> |
| EP025FD: Field Dissolved Oxygen            |                 |            |                |                                 |      |      |
| Dissolved Oxygen                           |                 | 0.01       | mg/L           | 5.58                            | <br> | <br> |
| Dissolved Oxygen - % Saturation            |                 | 0.1        | % saturation   | 63.2                            | <br> | <br> |

### Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) ED093F: Dissolved Major Cations

(WATER) EP005: Total Organic Carbon (TOC)

(WATER) EK055G: Ammonia as N by Discrete Analyser

(WATER) EG020T: Total Metals by ICP-MS

(WATER) EK057G: Nitrite as N by Discrete Analyser

(WATER) EK058G: Nitrate as N by Discrete Analyser

(WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser

(WATER) EA015: Total Dissolved Solids dried at 180 ± 5 °C

(WATER) ED045G: Chloride by Discrete Analyser

(WATER) ED037P: Alkalinity by PC Titrator

(WATER) EK040P: Fluoride by PC Titrator

(WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA





Appendix C:

Laboratory Chain of Custody (COC) & Certificates of Analysis

(COA) – Water Samples – Quarter 2

CHAIN OF CUSTODY ALS Laboratory: please tick →

🗇 Sydney: 277 Woodpark Rd, Smithield NSW 2076 👘 Erlabane. 32 Shand St. Stafford QLD 4053 👘 Melbourne. 2-4 Westall Rd, Smithield NSW 2076 Ph.03 171 Ph.02 8784 9555 E.samples.sydnay@alsativ.co.com Ph.03 243 7222 Elsamples.triabena@alsativ.co.com Ph.03 8549 9600 Elsamples.triabena@alsativ.co.com CI Newcastle: 5 Rosegum Rd, Warabrook NSW 2304 Ci Townsville: 14-15 Dearna Ci Bohle Of 0 4916 Ph C2 4968 9433 E camples hewcastleid alserivice com Ph/07 4756 0600 E: townsuits environmentalitietranem com

C Adelaide: 2-1 Suma Rd Pooraka SA 6095 Ph. 08 9359 0896 Fradelaus/Astronato.com

C Perth: 10 Hod Way, Malaga WA 8090 Ph 06 9209 7665 E: samples perth@alsenviro.com C Launceston: 27 Wallington St. Laundeston TAS 7250 Ph 03 6331 2158 Et laundeston St. Laundeston TAS 7250

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| ( <b>/</b>  |  |                                   | 1           |  |                          |             |  |                  | figures and second |                       | PR. 06 0601 21.       | sa c. annocsiongai          |  |
|---|--|-----------------------------------|-------------|--|--------------------------|-------------|--|------------------|--------------------|-----------------------|-----------------------|-----------------------------|--|
| CLIENT:   | Shellharbour City Council                    |                                   | TURNAR      | OUND REQUIREMENTS :                          | Standard TAT (List       | due date):  |  |                  |                    |                       | FORL                  | ABORATORY U                 |  |
|   | 41 Burelli St WOLLONGONG NSW 2               | 2500                              | e.g Ultra T | Trace Organics)                              | Non Standard or un       | gent TAT (L | .ist due date)                         | :                |                    |                       | Custody               | r Sodi Intact?              | No NA                                    |
| PROJECT:  | Dunmore Quarterly Ground Waters              | S EPL                             | ALS QUO     | DTE NO.: WO/030                              | /19 TENDER               |             |  | COC SEQU         | UENCE NUME         | BER (Circle)          | receipt?              | in the second second second |  |
| PRO JECT MANAGER  | Rvan Stirling                                |                                   |             |  |                          |             | COC:                                   |                  | 34                 | 56                    | 7 Random              | n Sample Temperah           | 1 <sup>™ Receipt</sup> 5•1. <sup>∞</sup> |
|   |  | SAMPLER N                         | OBILE:      |  |                          |             | REC                                    |                  | 3 4                | 5 6                   |                       |                             | Environmental Division                   |
| COC emailed to ALS?   | ( YES / NO)                                  | EDD FORM                          | AT (or defa | ult):  | Robert D                 | chio        |  | L                | In .               |                       | KEEINQ0131            |                             | Wollongong                               |
| Email Reports to :  | <u> </u>                                     |                                   | •           |  | DATE/TIME:               |             | DAT                                    | TIME:            |                    |                       | DATE/TIME:            | .· · ·                      |  |
| Email Invoice to :  |  |                                   |             |  | 2.3.23                   |             |  | 2.3              | 23/                |                       |                       |                             | EW2300830                                |
| COMMENTS/SPECIAL  | HANDLING/STORAGE OR DISPOSAL                 | .: CC reports to:                 |             |  |                          |             |  |                  |                    |                       |                       |                             | (())) ()) () () () ())                   |
| ALS USE ONLY  | SAMPLE                                       | DETAILS                           |             | CONTAINER INFO                               | RMATION                  | ANALY       | SIS REQUIR                             | ED includi       | ng SUITES          | NB. Suite Co          | des must be liste     | d to attract suite p        |  |
|   | MATRIX: SOI                                  | d(5) water(w)                     |             |  |                          | Whe         | re Matals are req                      | uired, specify T | otal (unfiltered b | ottle required) o     | Dissolved (field fil) | tered bottle required).     |  |
| LAB ID  | SAMPLE ID                                    | DATE / TIME                       | MATRIX      | TYPE & PRESERVATIN<br>(refer to codes below) | /E TOTAL<br>BOTTLES      | monia       | -2A (Alka,<br>4, Cl, Fl)<br>ered Ca, K | o                | solved Fe &        | 4 (NO2,<br>3)         | ld to<br>ofins        |                             | Telephone : 02 42253125                  |
|   |  |                                   |             | ·  |                          | Am          | ΞŚΞ                                    | <u>P</u>         | M<br>M             | 1 ż S                 | nur Ser               | 4                           |  |
|   | внас 2.                                      | 3.23 11:40                        | , w         |  |                          | 4           | 1                                      | 1                | 1                  | -                     |                       |                             | Field Tests - pH, EC, Temp & SWL         |
| ·   | ВНЗ  | 12:23                             | w           |  |                          | 1           | 1                                      | . 1              | 1                  | 1                     |                       |                             | Field Tests - pH, EC, Temp & SWL         |
|   | BH4  | 13:15                             | w           |  |                          | 1           | 1                                      | 4                | 1                  | 1                     |                       |                             | Field Tests - pH, EC, Temp & SWL         |
|   | BH9  | b'.50                             | w           |  |                          | 4           | 1                                      | ✓.               | 1                  | 1                     |                       |                             | Field Tests - pH, EC, Temp & SWL         |
|   | BH12R  | 12:40                             | w           |  |                          | 4           | <b>√</b>                               | 1                | 1                  | 1                     |                       |                             | Field Tests - pH, EC, Temp & SWL         |
|   | BH13   | 10:55                             | w           |  |                          | 1           | 1                                      | 1                | 1                  | 1                     |                       |                             | Field Tests - pH, EC, Temp & SWL         |
|   | BH14   | 11.12                             | w           |  |                          | 1           | 1                                      | 1                | 1                  | 1                     |                       |                             | Field Tests - pH, EC, Temp & SWL         |
| •   | BH15   | 10:05                             | w           |  |                          | 1           | 1                                      | 1                | 1                  | 1                     |                       |                             | Field Tests - pH, EC, Temp & SWL         |
|   | BH19R  | 12:55                             | w           |  |                          | 1           | ×                                      | 1                | 1                  | 1                     |                       |                             | Field Tests - pH, EC, Temp & SWL         |
|   | BH18   | 9:00                              | w           |  |                          | <b></b>     | <ul> <li>✓</li> </ul>                  | 1                | 1                  | <ul> <li>✓</li> </ul> |                       |                             | Field Tests - pH, EC, Temp & SWL         |
|   | BH21   | 6:40                              | w           |  |                          | 1           | <ul> <li>✓</li> </ul>                  | <b>*</b>         | 1                  | ~                     | -                     |                             | Field Tests - pH, EC, Temp & SWL         |
|   | BH22   | 12:10.                            | w           |  |                          | 1           | 1                                      | 1                | 1                  | 1                     |                       |                             | Field Tests - pH, EC, Temp & SWL         |
| ,   | Duplicate                                    | Linos                             | w           | 9:00   | *                        | 1           | 1                                      | *                | 1                  | 1                     |                       |                             | Field Tests - pH, EC, Temp & SWL         |
|   | Triplicate                                   | 1 9:00                            | w           | Rn(.   |                          |             |  |                  |                    |                       | 1                     |                             |  |
|   |  |                                   |             | · · · ·                                      |                          |             |  | -                |                    |                       |                       |                             |  |
|   |  |                                   |             |  |                          |             |  |                  |                    |                       |                       |                             |  |
| 1001 X 1/ 401 X 101 Y |  |                                   |             |  |                          |             |  |                  |                    |                       |                       |                             |  |
|   |  |                                   |             |  | TOTAL 10                 |             |  |                  |                    |                       |                       |                             |  |
| Water Container Codes:  | P = Unpreserved Plastic; N = Nitric Preserve | ed Plastic; ORC = Nitric Preserve | d ORC; SH   | = Sodium Hydroxide/Cd Preserved;             | S = Sodium Hydroxide Pre | served Plas | tic; AG = Ambe                         | r Glass Unpr     | eserved; AP -      | I<br>Airfreight Un;   | preserved Plastic     | ;                           |  |

V = VOA Vial HCI Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCI preserved Plastic; HS = HCI preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.



# **CERTIFICATE OF ANALYSIS**

| Work Order              | EW2300850                                     | Page                    | : 1 of 8   |
|-------------------------|---|-------------------------|--|
| Client                  | SHELLHARBOUR CITY COUNCIL                     | Laboratory              | Environmental Division NSW South Coast                     |
| Contact                 | : Ryan Stirling                               | Contact                 | : Aneta Prosaroski   |
| Address                 | : LAMERTON HOUSE, LAMERTON CRESCENT           | Address                 | : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia |
|                         | SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529 |                         |  |
| Telephone               | :   | Telephone               | : +61 2 4225 3125  |
| Project                 | : Dunmore Quarterly Groundwaters EPL          | Date Samples Received   | : 02-Mar-2023 15:40  |
| Order number            | : 147649                                      | Date Analysis Commenced | : 02-Mar-2023  |
| C-O-C number            | :   | Issue Date              | : 14-Mar-2023 12:38  |
| Sampler                 | : Robert DaLio                                |                         | Hac-MRA NATA   |
| Site                    | : DUNMORE LANDFILL TENDER                     |                         |  |
| Quote number            | : WO/030/19 TENDER GROUNDWATERS               |                         | Accordition No. 925  |
| No. of samples received | : 14  |                         | Accredited for compliance with                             |
| No. of samples analysed | : 13  |                         | ISO/IEC 17025 - Testing                                    |

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

#### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| Signatories      | Position                              | Accreditation Category             |
|------------------|---------------------------------------|------------------------------------|
| Aneta Prosaroski | Environmental Services Representative | Laboratory - Wollongong, NSW       |
| Ankit Joshi      | Senior Chemist - Inorganics           | Sydney Inorganics, Smithfield, NSW |



#### **General Comments**

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

- ø = ALS is not NATA accredited for these tests.
- ~ = Indicates an estimated value.
- Analytical work for this work order will be conducted at ALS Sydney.
- ED041G: LOR raised for Sulfate due to sample matrix
- It has been noted that Nitrite is greater than NOx, however this difference is within the limits of experimental variation sample #9
- EK057G/EK059G: It has been noted that Nitrite is greater than NOx on sample 3, however this difference is within the limits of experimental variation.
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Sampling and groundwater depth measurements completed by ALS Wollongong via inhouse sampling method EN/67.11 Groundwater Sampling Via High Flow and Bailer Method.
- Temperature performed by ALS Wollongong via in-house method EA116 and EN67 PK.
- Sample collection of Ground Waters by in-house EN67 where the "surface layer of the aquifer was sampled".
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.</li>



| Sub-Matrix: WATER<br>(Matrix: WATER)         |              |        | Sample ID      | BH1C              | BH3               | BH4               | BH9               | BH12R             |
|--|--------------|--------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|  |              | Sampli | ng date / time | 02-Mar-2023 01:40 | 02-Mar-2023 12:23 | 02-Mar-2023 13:15 | 02-Mar-2023 08:30 | 02-Mar-2023 10:40 |
| Compound                                     | CAS Number   | LOR    | Unit           | EW2300850-001     | EW2300850-002     | EW2300850-003     | EW2300850-004     | EW2300850-005     |
|  |              |        |                | Result            | Result            | Result            | Result            | Result            |
| EA005FD: Field pH                            |              |        |                |                   |                   |                   |                   |                   |
| рН   |              | 0.1    | pH Unit        | 7.1               | 7.3               | 7.4               | 7.2               | 6.8               |
| EA010FD: Field Conductivity                  |              |        |                |                   |                   |                   |                   |                   |
| Electrical Conductivity (Non                 |              | 1      | μS/cm          | 7960              | 1230              | 688               | 3690              | 1670              |
| Compensated)                                 |              |        |                |                   |                   |                   |                   |                   |
| EA116: Temperature                           |              |        |                |                   |                   |                   |                   |                   |
| Temperature                                  |              | 0.5    | °C             | 24.8              | 18.5              | 18.3              | 18.8              | 19.7              |
| ED037P: Alkalinity by PC Titrator            |              |        |                |                   |                   |                   |                   |                   |
| Hydroxide Alkalinity as CaCO3                | DMO-210-001  | 1      | mg/L           | <1                | <1                | <1                | <1                | <1                |
| Carbonate Alkalinity as CaCO3                | 3812-32-6    | 1      | mg/L           | <1                | <1                | <1                | <1                | <1                |
| Bicarbonate Alkalinity as CaCO3              | 71-52-3      | 1      | mg/L           | 2650              | 318               | 261               | 1760              | 619               |
| Total Alkalinity as CaCO3                    |              | 1      | mg/L           | 2650              | 318               | 261               | 1760              | 619               |
| ED041G: Sulfate (Turbidimetric) as SO4 2- by | y DA         |        |                |                   |                   |                   |                   |                   |
| Sulfate as SO4 - Turbidimetric               | 14808-79-8   | 1      | mg/L           | <10               | 143               | 51                | <10               | 208               |
| ED045G: Chloride by Discrete Analyser        |              |        |                |                   |                   |                   |                   |                   |
| Chloride                                     | 16887-00-6   | 1      | mg/L           | 1060              | 140               | 51                | 382               | 174               |
| ED093F: Dissolved Major Cations              |              |        |                |                   |                   |                   |                   |                   |
| Calcium                                      | 7440-70-2    | 1      | mg/L           | 148               | 134               | 92                | 183               | 207               |
| Potassium                                    | 7440-09-7    | 1      | mg/L           | 240               | 36                | 16                | 88                | 28                |
| EG020F: Dissolved Metals by ICP-MS           |              |        |                |                   |                   |                   |                   |                   |
| Manganese                                    | 7439-96-5    | 0.001  | mg/L           | 0.111             | 0.072             | 0.103             | 0.663             | 0.552             |
| Iron   | 7439-89-6    | 0.05   | mg/L           | 12.4              | 0.18              | 2.19              | 0.81              | 9.67              |
| EK040P: Fluoride by PC Titrator              |              |        |                |                   |                   |                   |                   |                   |
| Fluoride                                     | 16984-48-8   | 0.1    | mg/L           | 0.4               | 0.2               | 0.1               | 0.4               | 0.2               |
| EK055G: Ammonia as N by Discrete Analyse     | ər           |        |                |                   |                   |                   |                   |                   |
| Ammonia as N                                 | 7664-41-7    | 0.01   | mg/L           | 285               | 10.6              | 2.00              | 122               | 4.24              |
| EK057G: Nitrite as N by Discrete Analyser    |              |        |                |                   |                   |                   |                   |                   |
| Nitrite as N                                 | 14797-65-0   | 0.01   | mg/L           | <0.01             | 0.14              | 0.01              | <0.01             | <0.01             |
| EK058G: Nitrate as N by Discrete Analyser    |              |        |                |                   |                   |                   |                   |                   |
| Nitrate as N                                 | 14797-55-8   | 0.01   | mg/L           | <0.01             | 3.20              | <0.01             | 0.02              | <0.01             |
| EK059G: Nitrite plus Nitrate as N (NOx) by D | Discrete Ana | lyser  |                |                   |                   |                   |                   |                   |
| Nitrite + Nitrate as N                       |              | 0.01   | mg/L           | <0.01             | 3.34              | <0.01             | 0.02              | <0.01             |
| EP005: Total Organic Carbon (TOC)            |              |        |                |                   |                   |                   |                   |                   |
| Total Organic Carbon                         |              | 1      | mg/L           | 180               | 17                | 11                | 64                | 20                |



| Sub-Matrix: WATER<br>(Matrix: WATER)  |            |        | Sample ID      | BH1C              | BH3               | BH4               | BH9               | BH12R             |
|---------------------------------------|------------|--------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                                       |            | Sampli | ng date / time | 02-Mar-2023 01:40 | 02-Mar-2023 12:23 | 02-Mar-2023 13:15 | 02-Mar-2023 08:30 | 02-Mar-2023 10:40 |
| Compound                              | CAS Number | LOR    | Unit           | EW2300850-001     | EW2300850-002     | EW2300850-003     | EW2300850-004     | EW2300850-005     |
|                                       |            |        |                | Result            | Result            | Result            | Result            | Result            |
| QWI-EN 67.11 Sampling of Groundwaters |            |        |                |                   |                   |                   |                   |                   |
| Standing Water Level                  |            | 0.01   | m AHD          | 3.02              | 3.10              | 4.32              | 3.09              | 4.23              |



| Sub-Matrix: WATER<br>(Matrix: WATER)            |               |        | Sample ID      | BH13              | BH14              | BH15              | BH19R             | BH18              |  |  |  |  |
|---|---------------|--------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|--|--|--|--|
|   |               | Sampli | ng date / time | 02-Mar-2023 10:55 | 02-Mar-2023 11:12 | 02-Mar-2023 10:05 | 02-Mar-2023 12:55 | 02-Mar-2023 09:00 |  |  |  |  |
| Compound  | CAS Number    | LOR    | Unit           | EW2300850-006     | EW2300850-007     | EW2300850-008     | EW2300850-009     | EW2300850-010     |  |  |  |  |
|   |               |        |                | Result            | Result            | Result            | Result            | Result            |  |  |  |  |
| EA005FD: Field pH                               |               |        |                |                   |                   |                   |                   |                   |  |  |  |  |
| pH  |               | 0.1    | pH Unit        | 6.9               | 7.0               | 6.8               | 7.5               | 6.8               |  |  |  |  |
| EA010FD: Field Conductivity                     |               |        |                |                   |                   |                   |                   |                   |  |  |  |  |
| Electrical Conductivity (Non<br>Compensated)    |               | 1      | μS/cm          | 1930              | 762               | 2570              | 638               | 601               |  |  |  |  |
| EA116: Temperature                              |               |        |                |                   |                   |                   |                   |                   |  |  |  |  |
| Temperature                                     |               | 0.5    | °C             | 20.7              | 20.0              | 18.5              | 18.3              | 20.8              |  |  |  |  |
| ED037P: Alkalinity by PC Titrator               |               |        |                |                   |                   |                   |                   |                   |  |  |  |  |
| Hydroxide Alkalinity as CaCO3                   | DMO-210-001   | 1      | mg/L           | <1                | <1                | <1                | <1                | <1                |  |  |  |  |
| Carbonate Alkalinity as CaCO3                   | 3812-32-6     | 1      | mg/L           | <1                | <1                | <1                | <1                | <1                |  |  |  |  |
| Bicarbonate Alkalinity as CaCO3                 | 71-52-3       | 1      | mg/L           | 744               | 359               | 471               | 339               | 272               |  |  |  |  |
| Total Alkalinity as CaCO3                       |               | 1      | mg/L           | 744               | 359               | 471               | 339               | 272               |  |  |  |  |
| ED041G: Sulfate (Turbidimetric) as SO4 2- by DA |               |        |                |                   |                   |                   |                   |                   |  |  |  |  |
| Sulfate as SO4 - Turbidimetric                  | 14808-79-8    | 1      | mg/L           | 58                | 73                | 366               | 26                | <10               |  |  |  |  |
| ED045G: Chloride by Discrete Analyser           |               |        |                |                   |                   |                   |                   |                   |  |  |  |  |
| Chloride  | 16887-00-6    | 1      | mg/L           | 245               | 30                | 476               | 29                | 31                |  |  |  |  |
| ED093F: Dissolved Major Cations                 |               |        |                |                   |                   |                   |                   |                   |  |  |  |  |
| Calcium   | 7440-70-2     | 1      | mg/L           | 206               | 96                | 137               | 73                | 80                |  |  |  |  |
| Potassium                                       | 7440-09-7     | 1      | mg/L           | 21                | 14                | 174               | 41                | 11                |  |  |  |  |
| EG020F: Dissolved Metals by ICP-MS              |               |        |                |                   |                   |                   |                   |                   |  |  |  |  |
| Manganese                                       | 7439-96-5     | 0.001  | mg/L           | 0.419             | 0.107             | 0.273             | 0.055             | 0.139             |  |  |  |  |
| Iron  | 7439-89-6     | 0.05   | mg/L           | 3.45              | 0.55              | 9.33              | 0.89              | 2.02              |  |  |  |  |
| EK040P: Fluoride by PC Titrator                 |               |        |                |                   |                   |                   |                   |                   |  |  |  |  |
| Fluoride  | 16984-48-8    | 0.1    | mg/L           | 0.2               | 0.6               | 0.2               | 0.2               | 0.2               |  |  |  |  |
| EK055G: Ammonia as N by Discrete Analys         | er            |        |                |                   |                   |                   |                   |                   |  |  |  |  |
| Ammonia as N                                    | 7664-41-7     | 0.01   | mg/L           | 5.31              | 1.18              | 8.12              | 2.28              | 1.02              |  |  |  |  |
| EK057G: Nitrite as N by Discrete Analyser       |               |        |                |                   |                   |                   |                   |                   |  |  |  |  |
| Nitrite as N                                    | 14797-65-0    | 0.01   | mg/L           | <0.01             | <0.01             | 0.03              | 0.02              | <0.01             |  |  |  |  |
| EK058G: Nitrate as N by Discrete Analyser       |               |        |                |                   |                   |                   |                   |                   |  |  |  |  |
| Nitrate as N                                    | 14797-55-8    | 0.01   | mg/L           | <0.01             | <0.01             | 0.17              | <0.01             | <0.01             |  |  |  |  |
| EK059G: Nitrite plus Nitrate as N (NOx) by      | Discrete Anal | yser   |                |                   |                   |                   |                   |                   |  |  |  |  |
| Nitrite + Nitrate as N                          |               | 0.01   | mg/L           | <0.01             | <0.01             | 0.20              | 0.01              | <0.01             |  |  |  |  |
| EP005: Total Organic Carbon (TOC)               |               |        |                |                   |                   |                   |                   |                   |  |  |  |  |
| Total Organic Carbon                            |               | 1      | mg/L           | 28                | 13                | 34                | 6                 | 14                |  |  |  |  |



| Sub-Matrix: WATER<br>(Matrix: WATER)  |            |          | Sample ID      | BH13              | BH14              | BH15              | BH19R             | BH18              |
|---------------------------------------|------------|----------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                                       |            | Sampli   | ng date / time | 02-Mar-2023 10:55 | 02-Mar-2023 11:12 | 02-Mar-2023 10:05 | 02-Mar-2023 12:55 | 02-Mar-2023 09:00 |
| Compound                              | CAS Number | LOR Unit |                | EW2300850-006     | EW2300850-007     | EW2300850-008     | EW2300850-009     | EW2300850-010     |
|                                       |            |          |                | Result            | Result            | Result            | Result            | Result            |
| QWI-EN 67.11 Sampling of Groundwaters |            |          |                |                   |                   |                   |                   |                   |
| Standing Water Level                  |            | 0.01     | m AHD          | 4.19              | 4.62              | 0.53              | 4.52              | 2.10              |



| Sub-Matrix: WATER<br>(Matrix: WATER)            |                 |        | Sample ID      | BH21              | BH22              | Duplicate         |  |  |  |  |  |  |
|---|-----------------|--------|----------------|-------------------|-------------------|-------------------|--|--|--|--|--|--|
|   |                 | Sampli | ng date / time | 02-Mar-2023 09:40 | 02-Mar-2023 12:10 | 02-Mar-2023 09:00 |  |  |  |  |  |  |
| Compound  | CAS Number      | LOR    | Unit           | EW2300850-011     | EW2300850-012     | EW2300850-013     |  |  |  |  |  |  |
|   |                 |        |                | Result            | Result            | Result            |  |  |  |  |  |  |
| EA005FD: Field pH                               |                 |        |                |                   |                   |                   |  |  |  |  |  |  |
| рН  |                 | 0.1    | pH Unit        | 7.2               | 7.5               | 6.8               |  |  |  |  |  |  |
| EA010FD: Field Conductivity                     |                 |        |                |                   |                   |                   |  |  |  |  |  |  |
| Electrical Conductivity (Non<br>Compensated)    |                 | 1      | μS/cm          | 2480              | 2250              | 601               |  |  |  |  |  |  |
| EA116: Temperature                              |                 |        |                |                   |                   |                   |  |  |  |  |  |  |
| Temperature                                     |                 | 0.5    | °C             | 21.7              | 18.5              | 20.8              |  |  |  |  |  |  |
| ED037P: Alkalinity by PC Titrator               |                 |        |                |                   |                   |                   |  |  |  |  |  |  |
| Hydroxide Alkalinity as CaCO3                   | DMO-210-001     | 1      | mg/L           | <1                | <1                | <1                |  |  |  |  |  |  |
| Carbonate Alkalinity as CaCO3                   | 3812-32-6       | 1      | mg/L           | <1                | <1                | <1                |  |  |  |  |  |  |
| Bicarbonate Alkalinity as CaCO3                 | 71-52-3         | 1      | mg/L           | 851               | 651               | 281               |  |  |  |  |  |  |
| Total Alkalinity as CaCO3                       |                 | 1      | mg/L           | 851               | 651               | 281               |  |  |  |  |  |  |
| ED041G: Sulfate (Turbidimetric) as SO4 2- by DA |                 |        |                |                   |                   |                   |  |  |  |  |  |  |
| Sulfate as SO4 - Turbidimetric                  | 14808-79-8      | 1      | mg/L           | 145               | 223               | <10               |  |  |  |  |  |  |
| ED045G: Chloride by Discrete Analyser           |                 |        |                |                   |                   |                   |  |  |  |  |  |  |
| Chloride  | 16887-00-6      | 1      | mg/L           | 339               | 240               | 32                |  |  |  |  |  |  |
| ED093F: Dissolved Major Cations                 |                 |        |                |                   |                   |                   |  |  |  |  |  |  |
| Calcium   | 7440-70-2       | 1      | mg/L           | 169               | 113               | 81                |  |  |  |  |  |  |
| Potassium                                       | 7440-09-7       | 1      | mg/L           | 23                | 39                | 11                |  |  |  |  |  |  |
| EG020F: Dissolved Metals by ICP-MS              |                 |        |                |                   |                   |                   |  |  |  |  |  |  |
| Manganese                                       | 7439-96-5       | 0.001  | mg/L           | 0.507             | 0.043             | 0.142             |  |  |  |  |  |  |
| Iron  | 7439-89-6       | 0.05   | mg/L           | 0.26              | 0.06              | 2.02              |  |  |  |  |  |  |
| EK040P: Fluoride by PC Titrator                 |                 |        |                |                   |                   |                   |  |  |  |  |  |  |
| Fluoride  | 16984-48-8      | 0.1    | mg/L           | 0.4               | 0.4               | 0.2               |  |  |  |  |  |  |
| EK055G: Ammonia as N by Discrete Analy          | yser            |        |                |                   |                   |                   |  |  |  |  |  |  |
| Ammonia as N                                    | 7664-41-7       | 0.01   | mg/L           | 2.64              | 35.0              | 1.10              |  |  |  |  |  |  |
| EK057G: Nitrite as N by Discrete Analyse        | r               |        |                |                   |                   |                   |  |  |  |  |  |  |
| Nitrite as N                                    | 14797-65-0      | 0.01   | mg/L           | 0.32              | <0.01             | <0.01             |  |  |  |  |  |  |
| EK058G: Nitrate as N by Discrete Analyse        | er              |        |                |                   |                   |                   |  |  |  |  |  |  |
| Nitrate as N                                    | 14797-55-8      | 0.01   | mg/L           | 9.68              | <0.01             | <0.01             |  |  |  |  |  |  |
| EK059G: Nitrite plus Nitrate as N (NOx) b       | by Discrete Ana | lyser  |                |                   |                   |                   |  |  |  |  |  |  |
| Nitrite + Nitrate as N                          |                 | 0.01   | mg/L           | 10.0              | <0.01             | <0.01             |  |  |  |  |  |  |
| EP005: Total Organic Carbon (TOC)               |                 |        |                |                   |                   |                   |  |  |  |  |  |  |
| Total Organic Carbon                            |                 | 1      | mg/L           | 33                | 29                | 14                |  |  |  |  |  |  |



| Sub-Matrix: WATER<br>(Matrix: WATER)  |            |                      | Sample ID | BH21              | BH22              | Duplicate         | <br> |
|---------------------------------------|------------|----------------------|-----------|-------------------|-------------------|-------------------|------|
|                                       |            | Sampling date / time |           | 02-Mar-2023 09:40 | 02-Mar-2023 12:10 | 02-Mar-2023 09:00 | <br> |
| Compound                              | CAS Number | LOR Unit             |           | EW2300850-011     | EW2300850-012     | EW2300850-013     | <br> |
|                                       |            |                      |           | Result            | Result            | Result            | <br> |
| QWI-EN 67.11 Sampling of Groundwaters |            |                      |           |                   |                   |                   |      |
| Standing Water Level                  |            | 0.01                 | m AHD     | 2.97              | 2.60              | 2.10              | <br> |

#### Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) ED093F: Dissolved Major Cations

(WATER) EP005: Total Organic Carbon (TOC)

(WATER) EK055G: Ammonia as N by Discrete Analyser

(WATER) EG020F: Dissolved Metals by ICP-MS

(WATER) EK057G: Nitrite as N by Discrete Analyser

(WATER) EK058G: Nitrate as N by Discrete Analyser

(WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser

(WATER) ED045G: Chloride by Discrete Analyser

(WATER) ED037P: Alkalinity by PC Titrator

(WATER) EK040P: Fluoride by PC Titrator

(WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA

| ······································ |   |   |  |  |  |  |                            |   |  |   |                         |   |   |  |
|--|---|---|--|--|--|--|----------------------------|---|--|---|-------------------------|---|---|--|
| ALS                                    | CHAIN OF CUSTODY<br>ALS Laboratory: please tick →         | <ul> <li>Sydney: 277 Woodpark</li> <li>Ph: 02 8784 8555 Eisample</li> <li>Newcastle: 5 Rosegum</li> <li>Ph:02 4968 9433 Eisample</li> </ul> | Rd, Smithfield NS<br>s.sydney@alsen<br>Rd, Warabrook N<br>s newcastle@als- | SW 2176         Brisbane: 32 S           viro.com         Ph:07 3243 7222 E           ISW 2304         Townsville: 14           enviro.com         Ph:07 4796 0600 E | ihand St, Stafford (<br>:samples.brisbane<br>15 Desma Ct, Bol<br>: towneville.environm   | QLD 4053<br>@alsenviro.co<br>hie QLD 4818<br>ental@alsenviro | om Ph.(<br>3 D<br>2.com Ph | Melbourne: 2<br>13 8549 9600<br>Adelaide: 2-1<br>08 8359 0890 | 8-4 Westall Rd,<br>E: samples.me<br>I Burma Rd, Po<br>) E:adelaide@a | Springvale VIC<br>Ibourne@alser<br>oraka SA 5095<br>Ilsenviro.com | : 3171<br>Niro.com<br>; | <ul> <li>Perth: 10 H</li> <li>Ph: 08 9209 76</li> <li>Launcesto</li> <li>Ph: 03 6331 2</li> </ul> | ed Way, Malaga W<br>355 E: semples.pert<br>n: 27 Wellington St.<br>158 E: launceston@ | A 6699<br>tsi@aleenviro.com<br>Lauriceaton 7AS 7250<br>@aleenviro.com                                  |
| CLIENT:                                | Shellharbour City Council                                 |   | TURNAROL   | JND REQUIREMENTS :   | Standard   | TAT (List d  | lue date):                 |   |  |   |                         | FOR   | LABORATORY  | USE ONLY (Circle)  |
| OFFICE:                                | 41 Burelli St WOLLONGONG NSW 250                          | 0   | (Standard TAT may be longer for some tests<br>e.g., Ultra Trace Organics)  |  |  | dard or urge   | ent TAT (Lis               | t due date):  | :  |   |                         | Cusio   | dy Seel Intect?   | Yes No 🔭   |
| PROJECT:                               | Dunmore Quarterly Surface Waters EP                       | L   | ALS QUOTE NO.: WO/030/19 TEND  |  |  |  |                            |   | COC SEQUI  | NCE NUMBE   | ER (Circle)             | receip  | er nozer kenne<br>G   | No NA  |
| ORDER NUMBER:                          | ,   |   |  |  |  |  |                            | COC:  | 1 2  | 34  | 56                      | 7 Randi   | m Sample Tempe  | rature on Receipt 10.4 2   |
| PROJECT MANAGER:                       | Ryan Stirling   |   |  |  | ·  |  |                            | OF:   | 1 2  | 3 4   | 5 6                     | 7 Other   | comment   |  |
| SAMPLER: Robert Datio SAMPLER MOBILE:  |   |   |  |  | RELINQUISH   | ELINQUISHED BY: RECEIVED BY: RECEIVED BY: RECEIVED BY:       |                            |   |  | RECEIVED BY:  |                         |   |   |  |
| COC emailed to ALS?                    | (YES / NO)  | EDD FORM  | AT (or default   | ):   | labe   | -+ I.  | Dertis                     | ,   14  | -ار، بعن ال  | 12  | LN                      |   | _   |  |
| Email Reports to :                     |   |   |  |  | DATE/TIME:   | TE/TIME: DATE/TIME: DATE/TIME:                               |                            |   | DATE/TIME:   |   |                         |   |   |  |
| Email Invoice to :                     |   |   | - <b>4</b> 0   |  | 1.2  |  | <b>`</b>                   | -   | 1. 2.  | 4.9   |                         |   |   |  |
| COMMENTS/SPECIAL                       | HANDLING/STORAGE OR DISPOSAL:                             | CC reports to   | :  |  |  |  |                            |   |  |   |                         |   |   |  |
| ALS USE ONLY                           | SAMPLE DETAILS CONTAINER INF<br>MATRIX: Solid(S) Water(W) |   |  |  | +ORMATION ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Additional Information Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required). |  |                            |   |  | price)<br>Additional Information                                  |                         |   |   |  |
| LAB ID                                 | SAMPLE ID   | DATE / TIME   | MATRIX   | TYPE & PRESERVAT<br>(refer to codes below  | IVE<br>#) B  | TOTAL  | TSS                        | NT-1, NT-2A<br>(Ionic Balance)                                | TOC, NT-4, NH3, Total Mn   | Dissolved and Total Fe  | Turbidity               | NH3, NH4 & NÓ3  | TSS, TDS, TOC, Total Mn   | Comments on likely contaminant levels.<br>dilutions, or samples requiring specific QC<br>analysis etc. |
|  | SWP1  | 212 10  | w  |  |  |  | 1                          | 4   | 1  | 1   |                         |   |   | Field Tests - pH, EC, DO & Temp  |
|  | SWC_2   | 10.01<br>10'A   | w  |  |  |  |                            | 1   |  | 1   | 1                       | 1   | 1   | Field Tests - pH, EC, DO & Temp  |
|  | SWC_UP  | 11.00   | w  |  |  |  |                            | 4   |  | 1   | 1                       | 1   | ×   | Field Tests - pH, EC, DO & Temp  |
|  | SWC_DOWN  | 11:30   | w  |  |  |  |                            | 4   |  | 1   | 1                       | 1   |   | Field Tests - pH, EC, DO & Temp  |

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10 TOTAL Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserve V = VOA Vial HCI Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfunic Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCI preserved Plastic; HS = HCI preserved Speciation bottle; SP = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Solis; B = Unpreserved Bag.

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11:40

10:05

Telephone : 02 42253125

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Environmental Division

Wollongong Work Order Reference EW2300849

Field Tests - pH, EC, DO & Temp

Field Tests - pH, EC, DO & Temp

ISS:

Duplicate

SWC\_DOWN\_2



# **CERTIFICATE OF ANALYSIS**

| Work Order              | EW2300849                                     | Page                    | : 1 of 7   |
|-------------------------|---|-------------------------|--|
| Client                  | SHELLHARBOUR CITY COUNCIL                     | Laboratory              | Environmental Division NSW South Coast                     |
| Contact                 | : Ryan Stirling                               | Contact                 | : Aneta Prosaroski   |
| Address                 | : LAMERTON HOUSE, LAMERTON CRESCENT           | Address                 | : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia |
|                         | SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529 |                         |  |
| Telephone               | :   | Telephone               | : +61 2 4225 3125  |
| Project                 | : Dunmore Quarterly Surface Water EPL         | Date Samples Received   | : 01-Mar-2023 15:39  |
| Order number            | : 147649                                      | Date Analysis Commenced | : 01-Mar-2023  |
| C-O-C number            | :   | Issue Date              | : 14-Mar-2023 11:09  |
| Sampler                 | : Robert DaLio                                |                         | Hac-MRA NATA   |
| Site                    | : DUNMORE LANDFILL TENDER                     |                         |  |
| Quote number            | : WO/030/19 TENDER SURFACE WATER              |                         | Accorditation No. 925                                      |
| No. of samples received | : 6   |                         | Accredited for compliance with                             |
| No. of samples analysed | : 6   |                         | ISO/IEC 17025 - Testing                                    |

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

#### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| Signatories      | Position                              | Accreditation Category             |
|------------------|---------------------------------------|------------------------------------|
| Aneta Prosaroski | Environmental Services Representative | Laboratory - Wollongong, NSW       |
| Ankit Joshi      | Senior Chemist - Inorganics           | Sydney Inorganics, Smithfield, NSW |
| Wisam Marassa    | Inorganics Coordinator                | Sydney Inorganics, Smithfield, NSW |



#### **General Comments**

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- Analytical work for this work order will be conducted at ALS Sydney.
- As per QWI EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions Chloride, Alkalinity and Sulfate; and Major Cations Calcium, Magnesium, Potassium and Sodium.
   Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- EG020: Total Manganese results for samples EW2300849-#001 and #006 confirmed by re-digestion and reanalysis.
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.6 Rivers and Streams.
- Temperature performed by ALS Wollongong via in-house method EA116 and EN67 PK.
- Dissolved oxygen (DO) performed by ALS Wollongong via in-house method EA025FD and EN67 PK.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.4 Lakes and Reservoirs
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.</li>



| Sub-Matrix: WATER<br>(Matrix: WATER)             |             |        | Sample ID      | SWP1<br>Point 1   | SWC_2<br>Point 19 | SWC_UP<br>Point 20 | SWC_Down<br>Point 21 | SWC_DOWN_2<br>Point 22 |  |  |
|--|-------------|--------|----------------|-------------------|-------------------|--------------------|----------------------|------------------------|--|--|
|  |             | Sampli | ng date / time | 01-Mar-2023 00:00 | 01-Mar-2023 00:00 | 01-Mar-2023 00:00  | 01-Mar-2023 00:00    | 01-Mar-2023 00:00      |  |  |
| Compound   | CAS Number  | LOR    | Unit           | EW2300849-001     | EW2300849-002     | EW2300849-003      | EW2300849-004        | EW2300849-005          |  |  |
|  |             |        |                | Result            | Result            | Result             | Result               | Result                 |  |  |
| EA005FD: Field pH                                |             |        |                |                   |                   |                    |                      |                        |  |  |
| pH   |             | 0.1    | pH Unit        | 7.5               | 7.3               | 7.1                | 7.2                  | 7.3                    |  |  |
| EA010FD: Field Conductivity                      |             |        |                |                   |                   |                    |                      |                        |  |  |
| Electrical Conductivity (Non                     |             | 1      | µS/cm          | 1210              | 27500             | 24200              | 23800                | 23300                  |  |  |
| Compensated)                                     |             |        |                |                   |                   |                    |                      |                        |  |  |
| EA015: Total Dissolved Solids dried at 1         | 80 ± 5 °C   |        |                |                   |                   |                    |                      |                        |  |  |
| Total Dissolved Solids @180°C                    |             | 10     | mg/L           |                   | 14100             | 17200              | 15900                | 15400                  |  |  |
| EA025: Total Suspended Solids dried at 104 ± 2°C |             |        |                |                   |                   |                    |                      |                        |  |  |
| Suspended Solids (SS)                            |             | 5      | mg/L           | 99                |                   |                    |                      |                        |  |  |
| Suspended Solids (SS)                            |             | 5      | mg/L           |                   | <5                | <5                 | <5                   | <5                     |  |  |
| EA045: Turbidity                                 |             |        |                |                   |                   |                    |                      |                        |  |  |
| Turbidity  |             | 0.1    | NTU            | 40.0              | 2.2               | 3.2                | 2.9                  | 2.9                    |  |  |
| EA116: Temperature                               |             |        |                |                   |                   |                    |                      |                        |  |  |
| Temperature                                      |             | 0.5    | °C             | 21.9              | 22.9              | 22.3               | 23.8                 | 23.7                   |  |  |
| ED037P: Alkalinity by PC Titrator                |             |        |                |                   |                   |                    |                      |                        |  |  |
| Hydroxide Alkalinity as CaCO3                    | DMO-210-001 | 1      | mg/L           | <1                | <1                | <1                 | <1                   | <1                     |  |  |
| Carbonate Alkalinity as CaCO3                    | 3812-32-6   | 1      | mg/L           | <1                | <1                | <1                 | <1                   | <1                     |  |  |
| Bicarbonate Alkalinity as CaCO3                  | 71-52-3     | 1      | mg/L           | 397               | 114               | 138                | 131                  | 127                    |  |  |
| Total Alkalinity as CaCO3                        |             | 1      | mg/L           | 397               | 114               | 138                | 131                  | 127                    |  |  |
| ED041G: Sulfate (Turbidimetric) as SO4           | 2- by DA    |        |                |                   |                   |                    |                      |                        |  |  |
| Sulfate as SO4 - Turbidimetric                   | 14808-79-8  | 1      | mg/L           | 53                | 1390              | 913                | 886                  | 835                    |  |  |
| ED045G: Chloride by Discrete Analyser            |             |        |                |                   |                   |                    |                      |                        |  |  |
| Chloride   | 16887-00-6  | 1      | mg/L           | 147               | 9180              | 8150               | 7720                 | 7640                   |  |  |
| ED093F: Dissolved Major Cations                  |             |        |                |                   |                   |                    |                      |                        |  |  |
| Calcium  | 7440-70-2   | 1      | mg/L           | 67                | 201               | 180                | 170                  | 170                    |  |  |
| Magnesium  | 7439-95-4   | 1      | mg/L           | 33                | 633               | 552                | 522                  | 513                    |  |  |
| Sodium   | 7440-23-5   | 1      | mg/L           | 161               | 5460              | 4750               | 4510                 | 4340                   |  |  |
| Potassium  | 7440-09-7   | 1      | mg/L           | 13                | 194               | 173                | 163                  | 159                    |  |  |
| EG020F: Dissolved Metals by ICP-MS               |             |        |                |                   |                   |                    |                      |                        |  |  |
| Iron   | 7439-89-6   | 0.05   | mg/L           | 0.20              | 0.08              | 0.10               | 0.05                 | <0.05                  |  |  |
| EG020T: Total Metals by ICP-MS                   |             |        |                |                   |                   |                    |                      |                        |  |  |
| Manganese  | 7439-96-5   | 0.001  | mg/L           | 0.570             | 0.180             | 0.204              | 0.218                | 0.219                  |  |  |
| Iron   | 7439-89-6   | 0.05   | mg/L           | 1.45              | 0.46              | 0.61               | 0.59                 | 0.58                   |  |  |
| EK040P: Fluoride by PC Titrator                  |             |        |                |                   |                   |                    |                      |                        |  |  |



| Sub-Matrix: WATER<br>(Matrix: WATER)        |                 |        | Sample ID      | SWP1<br>Point 1   | SWC_2<br>Point 19 | SWC_UP<br>Point 20 | SWC_Down<br>Point 21 | SWC_DOWN_2<br>Point 22 |  |  |  |  |
|---|-----------------|--------|----------------|-------------------|-------------------|--------------------|----------------------|------------------------|--|--|--|--|
|   |                 | Sampli | ng date / time | 01-Mar-2023 00:00 | 01-Mar-2023 00:00 | 01-Mar-2023 00:00  | 01-Mar-2023 00:00    | 01-Mar-2023 00:00      |  |  |  |  |
| Compound                                    | CAS Number      | LOR    | Unit           | EW2300849-001     | EW2300849-002     | EW2300849-003      | EW2300849-004        | EW2300849-005          |  |  |  |  |
|   |                 |        |                | Result            | Result            | Result             | Result               | Result                 |  |  |  |  |
| EK040P: Fluoride by PC Titrator - Continued |                 |        |                |                   |                   |                    |                      |                        |  |  |  |  |
| Fluoride                                    | 16984-48-8      | 0.1    | mg/L           | 0.3               | 0.8               | 0.7                | 0.8                  | 0.7                    |  |  |  |  |
| EK055G: Ammonia as N by Discrete Analyser   |                 |        |                |                   |                   |                    |                      |                        |  |  |  |  |
| Ammonia as N                                | 7664-41-7       | 0.01   | mg/L           | 0.03              | 0.19              | 0.07               | 0.25                 | 0.12                   |  |  |  |  |
| EK055G-NH4: Ammonium as N by DA             |                 |        |                |                   |                   |                    |                      |                        |  |  |  |  |
| Ammonium as N                               | 14798-03-9_N    | 0.01   | mg/L           | 0.03              | 0.19              | 0.07               | 0.25                 | 0.12                   |  |  |  |  |
| EK057G: Nitrite as N by Discrete Analyser   |                 |        |                |                   |                   |                    |                      |                        |  |  |  |  |
| Nitrite as N                                | 14797-65-0      | 0.01   | mg/L           | <0.01             | 0.01              | <0.01              | 0.01                 | 0.01                   |  |  |  |  |
| EK058G: Nitrate as N by Discrete Analys     | er              |        |                |                   |                   |                    |                      |                        |  |  |  |  |
| Nitrate as N                                | 14797-55-8      | 0.01   | mg/L           | <0.01             | <0.01             | 0.02               | 0.01                 | 0.01                   |  |  |  |  |
| EK059G: Nitrite plus Nitrate as N (NOx)     | by Discrete Ana | lyser  |                |                   |                   |                    |                      |                        |  |  |  |  |
| Nitrite + Nitrate as N                      |                 | 0.01   | mg/L           | <0.01             | 0.01              | 0.02               | 0.02                 | 0.02                   |  |  |  |  |
| EN055: Ionic Balance                        |                 |        |                |                   |                   |                    |                      |                        |  |  |  |  |
| Ø Total Anions                              |                 | 0.01   | meq/L          | 13.2              | 290               | 252                | 239                  | 235                    |  |  |  |  |
| Ø Total Cations                             |                 | 0.01   | meq/L          | 13.4              | 304               | 265                | 252                  | 244                    |  |  |  |  |
| Ø Ionic Balance                             |                 | 0.01   | %              | 0.80              | 2.42              | 2.66               | 2.64                 | 1.69                   |  |  |  |  |
| EP005: Total Organic Carbon (TOC)           |                 |        |                |                   |                   |                    |                      |                        |  |  |  |  |
| Total Organic Carbon                        |                 | 1      | mg/L           | 24                | 7                 | 7                  | 7                    | <1                     |  |  |  |  |
| EP025FD: Field Dissolved Oxygen             |                 |        |                |                   |                   |                    |                      |                        |  |  |  |  |
| Dissolved Oxygen                            |                 | 0.01   | mg/L           | 8.53              | 4.16              | 4.79               | 4.92                 | 5.26                   |  |  |  |  |


| Sub-Matrix: WATER<br>(Matrix: WATER)         |             |        | Sample ID      | Duplicate         | <br> | <br> |
|--|-------------|--------|----------------|-------------------|------|------|
|  |             | Sampli | ng date / time | 01-Mar-2023 00:00 | <br> | <br> |
| Compound                                     | CAS Number  | LOR    | Unit           | EW2300849-006     | <br> | <br> |
|  |             |        |                | Result            | <br> | <br> |
| EA005FD: Field pH                            |             |        |                |                   |      |      |
| рН   |             | 0.1    | pH Unit        | 7.7               | <br> | <br> |
| EA010FD: Field Conductivity                  |             |        |                |                   |      |      |
| Electrical Conductivity (Non<br>Compensated) |             | 1      | µS/cm          | 1210              | <br> | <br> |
| EA015: Total Dissolved Solids dried at 1     | 80 ± 5 °C   |        |                |                   |      |      |
| Total Dissolved Solids @180°C                |             | 10     | mg/L           | 774               | <br> | <br> |
| EA025: Total Suspended Solids dried at       | 104 ± 2°C   |        |                |                   |      |      |
| Suspended Solids (SS)                        |             | 5      | mg/L           | 35                | <br> | <br> |
| EA045: Turbidity                             |             |        |                |                   |      |      |
| Turbidity                                    |             | 0.1    | NTU            | 18.7              | <br> | <br> |
| EA116: Temperature                           |             |        |                |                   |      |      |
| Temperature                                  |             | 0.5    | °C             | 21.9              | <br> | <br> |
| ED037P: Alkalinity by PC Titrator            |             |        |                |                   |      |      |
| Hydroxide Alkalinity as CaCO3                | DMO-210-001 | 1      | mg/L           | <1                | <br> | <br> |
| Carbonate Alkalinity as CaCO3                | 3812-32-6   | 1      | mg/L           | <1                | <br> | <br> |
| Bicarbonate Alkalinity as CaCO3              | 71-52-3     | 1      | mg/L           | 435               | <br> | <br> |
| Total Alkalinity as CaCO3                    |             | 1      | mg/L           | 435               | <br> | <br> |
| ED041G: Sulfate (Turbidimetric) as SO4       | 2- by DA    |        |                |                   |      |      |
| Sulfate as SO4 - Turbidimetric               | 14808-79-8  | 1      | mg/L           | 54                | <br> | <br> |
| ED045G: Chloride by Discrete Analyser        |             |        |                |                   |      |      |
| Chloride                                     | 16887-00-6  | 1      | mg/L           | 154               | <br> | <br> |
| ED093F: Dissolved Major Cations              |             |        |                |                   |      |      |
| Calcium                                      | 7440-70-2   | 1      | mg/L           | 66                | <br> | <br> |
| Magnesium                                    | 7439-95-4   | 1      | mg/L           | 33                | <br> | <br> |
| Sodium                                       | 7440-23-5   | 1      | mg/L           | 167               | <br> | <br> |
| Potassium                                    | 7440-09-7   | 1      | mg/L           | 13                | <br> | <br> |
| EG020F: Dissolved Metals by ICP-MS           |             |        |                |                   |      |      |
| Iron   | 7439-89-6   | 0.05   | mg/L           | 0.19              | <br> | <br> |
| EG020T: Total Metals by ICP-MS               |             |        |                |                   |      |      |
| Manganese                                    | 7439-96-5   | 0.001  | mg/L           | 0.426             | <br> | <br> |
| Iron   | 7439-89-6   | 0.05   | mg/L           | 1.33              | <br> | <br> |
| EK040P: Fluoride by PC Titrator              |             |        |                |                   |      |      |
| Fluoride                                     | 16984-48-8  | 0.1    | mg/L           | 0.3               | <br> | <br> |



| Sub-Matrix: WATER<br>(Matrix: WATER)     |                 |         | Sample ID      | Duplicate         | <br> | <br> |
|--|-----------------|---------|----------------|-------------------|------|------|
|  |                 | Samplii | ng date / time | 01-Mar-2023 00:00 | <br> | <br> |
| Compound                                 | CAS Number      | LOR     | Unit           | EW2300849-006     | <br> | <br> |
|  |                 |         |                | Result            | <br> | <br> |
| EK055G: Ammonia as N by Discrete Anal    | yser            |         |                |                   |      |      |
| Ammonia as N                             | 7664-41-7       | 0.01    | mg/L           | 0.01              | <br> | <br> |
| EK055G-NH4: Ammonium as N by DA          |                 |         |                |                   |      |      |
| Ammonium as N                            | 14798-03-9_N    | 0.01    | mg/L           | <0.01             | <br> | <br> |
| EK057G: Nitrite as N by Discrete Analyse | ə <b>r</b>      |         |                |                   |      |      |
| Nitrite as N                             | 14797-65-0      | 0.01    | mg/L           | <0.01             | <br> | <br> |
| EK058G: Nitrate as N by Discrete Analys  | er              |         |                |                   |      |      |
| Nitrate as N                             | 14797-55-8      | 0.01    | mg/L           | 0.01              | <br> | <br> |
| EK059G: Nitrite plus Nitrate as N (NOx)  | by Discrete Ana | lyser   |                |                   |      |      |
| Nitrite + Nitrate as N                   |                 | 0.01    | mg/L           | 0.01              | <br> | <br> |
| EN055: Ionic Balance                     |                 |         |                |                   |      |      |
| Ø Total Anions                           |                 | 0.01    | meq/L          | 14.2              | <br> | <br> |
| Ø Total Cations                          |                 | 0.01    | meq/L          | 13.6              | <br> | <br> |
| Ø Ionic Balance                          |                 | 0.01    | %              | 1.99              | <br> | <br> |
| EP005: Total Organic Carbon (TOC)        |                 |         |                |                   |      |      |
| Total Organic Carbon                     |                 | 1       | mg/L           | 16                | <br> | <br> |
| EP025FD: Field Dissolved Oxygen          |                 |         |                |                   |      |      |
| Dissolved Oxygen                         |                 | 0.01    | mg/L           | 8.51              | <br> | <br> |



#### Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) EA045: Turbidity (WATER) EP005: Total Organic Carbon (TOC) (WATER) EG020F: Dissolved Metals by ICP-MS (WATER) EG020T: Total Metals by ICP-MS (WATER) EK057G: Nitrite as N by Discrete Analyser (WATER) EK058G: Nitrate as N by Discrete Analyser (WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (WATER) EA025: Total Suspended Solids dried at 104 ± 2°C (WATER) EK055G-NH4: Ammonium as N by DA (WATER) EK055G: Ammonia as N by Discrete Analyser (WATER) EN055: Ionic Balance (WATER) ED045G: Chloride by Discrete Analyser (WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (WATER) EK040P: Fluoride by PC Titrator (WATER) ED037P: Alkalinity by PC Titrator (WATER) ED093F: Dissolved Major Cations

(WATER) EA015: Total Dissolved Solids dried at 180 ± 5 °C

| À               | CHAIN OF CUSTODY<br>ALS Laboratory: please tick → | <ul> <li>Sydney: 277 Woodper<br/>Ph. 02 9784 9555 E samp</li> <li>Newcastle: 5 Rosegur</li> <li>Ph.02 4988 9433 E samp</li> </ul> | k Rd. Smithüeld N<br>Jestsychey@alser<br>n Rd. Watabrook I<br>Jestnewcastlet@als | SW 2176 [] Brisbane: 32 S<br>vire com Ph:07 3243 7222 E<br>NSW 2304 [] Townsville: 14<br>serviro com Ph:07 4796 0500 E | Shand St. Stafford QLD 4053<br>5 samples brisbaneiĝalsenvin<br>4-15 Desma Ct. Bonle QLD 481<br>5: tovnsellsjeruronmental@alseru | com Ph<br>8 Ci<br>ro.ceni Pt          | Melbourne: 2<br>03 8649 0600<br>Adelaide: 2-1<br>1. 08 8359 0890 | -4 Wastali Rd.<br>E: samplas.me<br>Burma Rd. Po<br>) E.adelaida@a | Spangvale VK<br>albourne@alse<br>soraka SA 509<br>alseoviro com | 3 3171<br>av tulcom<br>6 | <ul> <li>Perth: 10 I</li> <li>Ph: 08 9209 7</li> <li>Launcesta</li> <li>Ph: 03 6331</li> </ul> | Hod Wey, Malaga W/<br>7665 E: samples.perti<br>on: 27 Weilingtor: St.<br>2158 E: tauncestor @ | A 6090<br>h/ĝaisenviro.:<br>Launceston T<br>Balsenviro cor | 30m<br>(AS (250)<br>n   |
|-----------------|---|---|--|--|---|---------------------------------------|--|---|---|--------------------------|--|---|--|---|
| LS)<br>         | Sheilharbour City Council                         | 1.1.02 metro (metro)  | TURNARO  | UND REQUIREMENTS :   | Standard TAT (List  | due date):                            | ·  |   |   |                          | FOR  | LABORATORY  | USE ONL  | (Circle)  |
| :E:             | 41 Burelli St WOLLONGONG NSW 2                    | 2500  | (Standard TA<br>e.g., Ultra Tra  | f may be longer for some tests<br>ce Organics)   | Non Standard or urg   | ent TAT (Li                           | st due date):  |   |   |                          | Cust   | xdy Seal latact (<br>Ica I filozian lion tife)  | ka present la  | · · · · · · · · · · · · · · · · · · ·   |
| ECT:            | Dunmore Quarterly Leachate                        |   | ALS QUOT   | E NO.: WO/03   | 30/19 TENDER  |                                       |  | COC SEQUI   | ENCE NUMB   | ER (Circle               | ) recei  | 109 (1010-1020)<br>1917   | 10 Plote   | <u> </u>  |
| R NUMBER:       | ,,,   |   |  |  |   |                                       | COC:   | 1 2   | 34  | 56                       | 7 Rand   | iom Sample Tempe  | erature on Re  | <sup>osta</sup> 10.4 °  |
| ECT MANAGER:    | Ryan Stirling                                     |   |  |  |   |                                       | OF:  | 1 2   | 3 4   | 56                       | 7 Othe   | rcomment  |  |   |
|                 | hert D.L.   | SAMPLER   | MOBILE:  |  | RELINQUISHED BY:  | -                                     | RECI   | EIVED BY:   |   | <b>~</b> :               | RELINQU  | ISHED BY:   |  | RECEIVED BY:  |
| amailed to ALS2 |   | EDD FORM  | AT (or defaul  | t):  | [Lobert   | Derki                                 |  | Kobé  | チナノ   | うち                       |  |   |  |   |
| Reports to :    |   |   |  |  | DATE/TIME:  |                                       | DATE   | E/TİME:   | <u>.</u> •  |                          | DATE/TIM   | E:  |  | DATE/TIME:  |
| Invoice to :    |   |   |  |  | 1.34  | .3                                    |  | 1.3.  | 23  |                          |  |   |  |   |
| MENTS/SPECIAL   | HANDLING/STORAGE OR DISPOSA                       | L: CC reports to  |  |  |   |                                       |  |   |   |                          |  |   |  |   |
| LSUSEONLY       | SAMPLE<br>MATRIX: Sol                             | E DETAILS<br>lid(S) Water(W)  |  | CONTAINER INF  | ORMATION  | ANALY                                 | SIS REQUIR<br>e Metals are req                                   | ED includir   | ng SUITES (   | NB. Suite Co             | odes must be li<br>or Dissolved (fiel  | isted to attract suite  | a price)<br>d}.  | Additional Information  |
|                 |   | DATE / TIME   | MATRIX   | TYPE & PRESERVA  | TIVE TOTAL  | lia                                   | (Alka,<br>, Fl)<br>I Ca, K                                       |   | e & Mn  | 102,                     |  | z   | Ce<br>or   | omments on likely contaminant levels, d<br>samples requiring specific QC analysis |
| LAB ID          | SAMPLE ID   | DATE  | MALINIA  | (refer to codes belo   | W) BOTTLES  | Ammor                                 | NT-2A<br>So4, CI<br>Filtered                                     | 100   | Total F   | NT-4 (N<br>NO3)          |  |   |  |   |
|                 | Leachate Sump                                     | B. 23 12:1  | 5 W  |  |   | 1                                     | 1  | 1   | <ul> <li>✓</li> </ul>   | 1                        |  | ~   |  | Field Tests - pH, EC, Temp &  |
|                 |   |   |  |  |   |                                       |  |   |   | Ì                        |  |   |  |   |
|                 |   |   |  |  |   |                                       |  |   |   |                          |  |   |  |   |
|                 |   |   |  |  |   |                                       |  |   |   |                          |  |   |  |   |
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|                 |   |   |  |  |   |                                       |  |   |   |                          |  |   |  |   |
|                 |   |   |  |  |   |                                       |  |   |   |                          | ļ  |   |  |   |
|                 |   |   |  |  |   |                                       |  |   |   |                          | Envir<br>Wolk  | ronmental<br>ongong   | Divisi   | 01  |
|                 |   |   |  |  |   |                                       |  |   |   |                          | wa<br>E  | W230  | eference<br>)084   | 16  |
|                 |   |   |  |  |   | <u> </u>                              |  |   | -   |                          |  | <b>#  _</b> " Dim"+   |  |   |
|                 | · · · ·   |   |  |  |   |                                       | <u> </u>   | •   |   |                          |  |   |  |   |
|                 |   |   |  |  |   |                                       |  |   |   |                          |  |   | 11 - 1.<br>11 - 1 - 1                                      |   |
|                 |   |   |  |  |   |                                       |  |   |   |                          | Telepho  | ne : 02 42253126  | 6  |   |
|                 |   |   |  |  |   |                                       | _  |   |   | <u> </u>                 |  |   |  |   |
|                 |   |   |  |  |   | · · · · · · · · · · · · · · · · · · · |  |   | -   |                          |  |   |  |   |
|                 |   |   |  |  | TOTAL 10  |                                       |  |   |   |                          |  |   |  |   |

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# **CERTIFICATE OF ANALYSIS**

| Work Order              | EW2300846                                     | Page                    | : 1 of 4   |  |  |  |  |
|-------------------------|---|-------------------------|--|--|--|--|--|
| Client                  | SHELLHARBOUR CITY COUNCIL                     | Laboratory              | Environmental Division NSW South Coast                     |  |  |  |  |
| Contact                 | : Ryan Stirling                               | Contact                 | : Aneta Prosaroski   |  |  |  |  |
| Address                 | : LAMERTON HOUSE, LAMERTON CRESCENT           | Address                 | : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia |  |  |  |  |
|                         | SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529 |                         |  |  |  |  |  |
| Telephone               | :   | Telephone               | : +61 2 4225 3125  |  |  |  |  |
| Project                 | : Dunmore Quarterly Leachate                  | Date Samples Received   | : 01-Mar-2023 15:40  |  |  |  |  |
| Order number            | : 147649                                      | Date Analysis Commenced | : 03-Mar-2023  |  |  |  |  |
| C-O-C number            | :   | Issue Date              | : 10-Mar-2023 15:51  |  |  |  |  |
| Sampler                 | : Robert DaLio                                |                         | HALA NATA  |  |  |  |  |
| Site                    | : DUNMORE LANDFILL TENDER                     |                         |  |  |  |  |  |
| Quote number            | : WO/030/19 TENDER LEACHATE                   |                         | The Annual Annual Annual Annual Annual Annual              |  |  |  |  |
| No. of samples received | : 1   |                         | Accredited for compliance with                             |  |  |  |  |
| No. of samples analysed | : 1   |                         | ISO/IEC 17025 - Testing                                    |  |  |  |  |

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

#### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| Signatories      | Position                              | Accreditation Category             |
|------------------|---------------------------------------|------------------------------------|
| Aneta Prosaroski | Environmental Services Representative | Laboratory - Wollongong, NSW       |
| Ankit Joshi      | Senior Chemist - Inorganics           | Sydney Inorganics, Smithfield, NSW |
| Wisam Marassa    | Inorganics Coordinator                | Sydney Inorganics, Smithfield, NSW |



#### **General Comments**

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

- ø = ALS is not NATA accredited for these tests.
- ~ = Indicates an estimated value.
- Analytical work for this work order will be conducted at ALS Sydney.
- EK057G: LOR raised for sample 1 due to sample matrix.
- ED041G: LOR raised for Sulfate due to sample matrix
- EK059G: LOR raised for NOx due to sample matrix
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Temperature performed by ALS Wollongong via in-house method EA116 and EN67 PK.
- Dissolved oxygen (DO) performed by ALS Wollongong via in-house method EA025FD and EN67 PK.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.10 Wastewaters
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.</li>



| Sub-Matrix: WATER<br>(Matrix: WATER)         |                 |        | Sample ID      | Leachate Sump     | <br> | <br> |
|--|-----------------|--------|----------------|-------------------|------|------|
|  |                 | Sampli | ng date / time | 01-Mar-2023 00:00 | <br> | <br> |
| Compound                                     | CAS Number      | LOR    | Unit           | EW2300846-001     | <br> | <br> |
|  |                 |        |                | Result            | <br> | <br> |
| EA005FD: Field pH                            |                 |        |                |                   |      |      |
| рН   |                 | 0.1    | pH Unit        | 8.9               | <br> | <br> |
| EA010FD: Field Conductivity                  |                 |        |                |                   |      |      |
| Electrical Conductivity (Non<br>Compensated) |                 | 1      | µS/cm          | 10100             | <br> | <br> |
| EA015: Total Dissolved Solids dried at 1     | 80 ± 5 °C       |        |                |                   |      |      |
| Total Dissolved Solids @180°C                |                 | 10     | mg/L           | 5460              | <br> | <br> |
| EA116: Temperature                           |                 |        |                |                   |      |      |
| Temperature                                  |                 | 0.1    | °C             | 27.7              | <br> | <br> |
| ED037P: Alkalinity by PC Titrator            |                 |        |                |                   |      |      |
| Hydroxide Alkalinity as CaCO3                | DMO-210-001     | 1      | mg/L           | <1                | <br> | <br> |
| Carbonate Alkalinity as CaCO3                | 3812-32-6       | 1      | mg/L           | 967               | <br> | <br> |
| Bicarbonate Alkalinity as CaCO3              | 71-52-3         | 1      | mg/L           | 2110              | <br> | <br> |
| Total Alkalinity as CaCO3                    |                 | 1      | mg/L           | 3070              | <br> | <br> |
| ED041G: Sulfate (Turbidimetric) as SO4 :     | 2- by DA        |        |                |                   |      |      |
| Sulfate as SO4 - Turbidimetric               | 14808-79-8      | 1      | mg/L           | <20               | <br> | <br> |
| ED045G: Chloride by Discrete Analyser        |                 |        |                |                   |      |      |
| Chloride                                     | 16887-00-6      | 1      | mg/L           | 1540              | <br> | <br> |
| ED093F: Dissolved Major Cations              |                 |        |                |                   |      |      |
| Calcium                                      | 7440-70-2       | 1      | mg/L           | 40                | <br> | <br> |
| Potassium                                    | 7440-09-7       | 1      | mg/L           | 400               | <br> | <br> |
| EG020T: Total Metals by ICP-MS               |                 |        |                |                   |      |      |
| Manganese                                    | 7439-96-5       | 0.001  | mg/L           | 0.113             | <br> | <br> |
| Iron   | 7439-89-6       | 0.05   | mg/L           | 1.35              | <br> | <br> |
| EK040P: Fluoride by PC Titrator              |                 |        |                |                   |      |      |
| Fluoride                                     | 16984-48-8      | 0.1    | mg/L           | 0.3               | <br> | <br> |
| EK055G: Ammonia as N by Discrete Ana         | lyser           |        |                |                   |      |      |
| Ammonia as N                                 | 7664-41-7       | 0.01   | mg/L           | 426               | <br> | <br> |
| EK057G: Nitrite as N by Discrete Analys      | er              |        |                |                   |      |      |
| Nitrite as N                                 | 14797-65-0      | 0.01   | mg/L           | <0.10             | <br> | <br> |
| EK058G: Nitrate as N by Discrete Analys      | ser             |        |                |                   |      |      |
| Nitrate as N                                 | 14797-55-8      | 0.01   | mg/L           | <0.10             | <br> | <br> |
| EK059G: Nitrite plus Nitrate as N (NOx)      | by Discrete Ana | lyser  |                |                   |      |      |
| Nitrite + Nitrate as N                       |                 | 0.01   | mg/L           | <0.10             | <br> | <br> |



| Sub-Matrix: WATER<br>(Matrix: WATER) |            |                      | Sample ID    | Leachate Sump     | <br> | <br> |
|--------------------------------------|------------|----------------------|--------------|-------------------|------|------|
|                                      |            | Sampling date / time |              | 01-Mar-2023 00:00 | <br> | <br> |
| Compound                             | CAS Number | LOR                  | Unit         | EW2300846-001     | <br> | <br> |
|                                      |            |                      |              | Result            | <br> | <br> |
| EP005: Total Organic Carbon (TOC)    |            |                      |              |                   |      |      |
| Total Organic Carbon                 |            | 1                    | mg/L         | 384               | <br> | <br> |
| EP025FD: Field Dissolved Oxygen      |            |                      |              |                   |      |      |
| Dissolved Oxygen                     |            | 0.01                 | mg/L         | 2.14              | <br> | <br> |
| Dissolved Oxygen - % Saturation      |            | 0.1                  | % saturation | 28.1              | <br> | <br> |

#### Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) ED093F: Dissolved Major Cations

(WATER) EP005: Total Organic Carbon (TOC)

(WATER) EK055G: Ammonia as N by Discrete Analyser

(WATER) EG020T: Total Metals by ICP-MS

(WATER) EK057G: Nitrite as N by Discrete Analyser

(WATER) EK058G: Nitrate as N by Discrete Analyser

(WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser

(WATER) EA015: Total Dissolved Solids dried at 180  $\pm$  5 °C

(WATER) ED045G: Chloride by Discrete Analyser

(WATER) ED037P: Alkalinity by PC Titrator

(WATER) EK040P: Fluoride by PC Titrator

(WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA

CHAIN OF CUSTODY ALS Laboratory: please tick ->

C Sydney, 277 Woodpark Rd, Smithfield NSW 2178 Ph: 02 8794 9656 Elsamples svine y@plaenviro.com

 Brisbane, 32 Shand St, Stafford QLD 4063
 Ph.07 3243 7222 Elsamples trisbane@arsenveb.com En cuz cross sobiliti camples consegue anter en cuant El Newcastlet 5 Roseguer Rd, Warabrook NSW 2304 El Newcastlet 5 Roseguer Rd, Warabrook NSW 2304 En Commavillet 14-15 Desma Ch Bohle CLD 4915 Ph.02 4963 3433 Examples newcastlog alsonie inter com Ph.02 4963 3433 Examples newcastlog alsonie inter com Ph.02 4963 3433 Examples newcastlog alsonie inter com Ph.02 4963 3433 Examples newcastlog alsonie inter com Ph.02 4963 3433 Examples newcastlog alsonie inter com Ph.02 4963 3433 Examples newcastlog alsonie inter com Ph.02 4963 3433 Examples newcastlog alsonie inter com Ph.02 4963 3433 Examples newcastlog alsonie inter com Ph.02 4963 3433 Examples newcastlog alsonie inter com Ph.02 4963 3433 Examples newcastlog alsonie inter com Ph.02 4963 3433 Examples newcastlog alsonie inter com Ph.02 4963 3433 Examples newcastlog alsonie inter com Ph.02 4963 3433 Examples newcastlog alsonie inter com Ph.02 4963 3433 Examples newcastlog alsonie inter com Ph.02 4963 3433 Examples newcastlog alsonie inter com Ph.02 4963 3433 Examples newcastlog alsonie inter com Ph.02 4963 3433 Examples newcastlog alsonie inter com Ph.02 4963 3433 Examples newcastlog alsonie inter com Ph.02 4963 4433  Examples newcastlog alsonie inter com

Ci - **Melbourne**, 2-4 Westall Rd. Springvale VIO 3171 Ph/03 8549 9600 El samples inelbourne@atsenvin.com D. Adetaide: 2-1 Burma Ro, Pocraka SA 5096
 Ph. 08 8359 0860 Etadetaide@alsenviro.com

El Parth: 10 Hod Way, Malaga WA 8090 Ph: 08 9009 7855 El samples perth@alsenviro.com Launceston: 27 Wellington St, Launceston TAS 7260
 Ph. 03 8321 2158 E launceston dialservin com

| CLIENT:             | Shellharbour City Council     |                              |                |   | Standard TAT          | (List d   | ue date):          |  |            |               |                                     | FO                               | LABORA              | TORY USE                     | ONLY (Circle)  |                                    |
|---------------------|-------------------------------|------------------------------|----------------|---|-----------------------|-----------|--------------------|--|------------|---------------|-------------------------------------|----------------------------------|---------------------|------------------------------|--|------------------------------------|
| OFFICE:             | 41 Burelli St WOLLONGONG NSW  | 2500                         | e.g. Ultra Tra | ce Organics)                            | Non Standard          | or urge   | nt TAT (Lis        | due date)                                      | :          |               |                                     | Cust                             | ody Seal Inla       | d?                           | Yes No.  | - (NA)                             |
| PROJECT:            | Dunmore Quarterly Leachate    |                              | ALS QUOT       | E NO.: WO/0                             | 30/19 TENDER          |           |                    | COC SEQUENCE NUMBER (Circle)                   |            |               |                                     | Erec                             | lcə/frozen i<br>+*? | ve bricks pies               | ent upon Fes No  | N/A                                |
| ORDER NUMBER:       |                               |                              |                |   |                       |           |                    | coc  | 1 2        | 34            | 56                                  | 7 Ren                            | Iom Sample '        | Temperature o                | on Receipt 1   |                                    |
| PROJECT MANAGER     | : Ryan Stirling               |                              |                |   |                       |           |                    | OF:  | 1 2        | 34            | 56                                  | 7 Qthe                           | r comment:          |                              | $(-\pi)$   |                                    |
| SAMPLER: 20         | be-t Dal                      | SAMPLER                      | MOBILE:        |   | RELINQUISHED B        | Y: _      |                    | REC  | EIVED BY:  |               | ,                                   | RELINQU                          | ISHED BY:           |                              | RECEIVED BY:   |                                    |
| COC emailed to ALS? | (YES / NO)                    | EDD FORM                     | AT (or default | ;):                                     | - 1202at              | 1_        | Deg K 1X           | •   †  | 4000       | アピ            | w                                   |                                  |                     |                              |  |                                    |
| Email Reports to :  | mail Reports to :             |                              |                |   |                       |           |                    |  |            |               | DATE/TIM                            | E:                               | •                   | DATE/TIME:                   |  |                                    |
| Email Invoice to :  | mail Invoice to :             |                              |                |   |                       | ל         |                    | 1  | 3.2        | 2             |                                     |                                  |                     |                              |  |                                    |
| COMMENTS/SPECIAL    | L HANDLING/STORAGE OR DISPOSA | L: CC reports to             | :              |   | · ·                   |           |                    |  |            |               |                                     |                                  |                     |                              | ,  |                                    |
| ALS USE ONLY        | SAMPLI<br>MATRIX: So          | E DETAILS<br>lid(S) Water(W) |                | CONTAINER INF                           | ORMATION              |           | ANALYSI<br>Where I | S REQUIR                                       | ED Includi | ing SUITES    | (NB. Suite Co<br>ottle required) or | des must be l<br>Dissolved (fie) | isted to attrac     | t suite price)<br>required). | Additional Informa   | tion                               |
| LAB ID              | SAMPLE ID                     | DATE / TIME                  | MATRIX         | TYPE & PRESERVA<br>(refer to codes belo | TIVE TOTA<br>w) BOTTI | IL<br>.ES | Ammonia            | NT-2A (Alka,<br>So4, CI, FI)<br>Filtered Ca, K | 100        | Total Fe & Mn | NT-4 (NO2,<br>NO3)                  |                                  | -                   |                              | Comments on likely contaminant<br>or samples requiring specific QC a | evels, dilutions,<br>inalysis etc. |
|                     | Leachate Storage Tank - LP1   | 1232 17                      | w.w            |   |                       |           | 1                  | 4  | 1          | 1             | 1                                   |                                  |                     |                              | Field Tests - pH EC T  |                                    |

|   | Leachate Storage Tank - LP1  | 1.3.23 12   | 20 ·W  |  |  |                               | 1                              | ¥                            | 1                               | 1                            | ×                                       | •                                   |                    | Field Tests - pH, EC, Temp & DO |
|---|--|---|--|--|--|-------------------------------|--------------------------------|------------------------------|---------------------------------|------------------------------|---|-------------------------------------|--------------------|---------------------------------|
|   |  |   |  |  |  |                               |                                |                              |                                 |                              |   |                                     |                    |                                 |
|   |  |   |  |  |  |                               |                                |                              |                                 |                              |   |                                     |                    |                                 |
|   |  |   |  |  |  |                               |                                |                              |                                 |                              |   |                                     |                    |                                 |
|   |  |   |  |  |  |                               |                                |                              |                                 |                              |   |                                     |                    |                                 |
|   |  |   |  |  |  |                               |                                |                              |                                 |                              |   |                                     |                    |                                 |
|   |  |   |  |  |  |                               |                                |                              |                                 |                              |   |                                     |                    |                                 |
|   |  |   |  |  |  |                               |                                |                              |                                 |                              |   | ntal Divis                          | sion               |                                 |
|   |  |   |  | -  |  |                               |                                |                              |                                 | E                            | nvironm<br>Nollondo                     | ng                                  | Cê.                |                                 |
|   |  |   |  |  |  |                               |                                |                              |                                 | \                            | Work Or                                 | 2300                                | <u>8</u> 47        |                                 |
|   |  |   |  |  |  |                               |                                |                              |                                 |                              | Evv                                     | 2000                                |                    |                                 |
|   |  |   |  |  |  |                               |                                |                              |                                 |                              |   | 12.1210 101                         |                    |                                 |
| ·   |  |   |  |  |  |                               |                                |                              |                                 | n                            |   |                                     | 3. 111             |                                 |
|   |  |   |  |  |  |                               |                                |                              |                                 | <u>.</u> .                   |   | NG DAT F                            | <b>NET I</b>       |                                 |
|   |  |   |  | - ne : = :   |  |                               |                                |                              |                                 | ,                            | Telephone                               | 02 42253125                         |                    |                                 |
|   |  |   |  |  |  |                               |                                |                              |                                 |                              |   |                                     |                    |                                 |
| ب<br>مراجع  | -  |   |  |  |  |                               |                                |                              |                                 |                              |   |                                     |                    |                                 |
|   |  |   |  |  | TOTAL  | 10                            |                                |                              |                                 |                              |   |                                     |                    |                                 |
| V = VOA Vial HCI Preserved<br>Z = Zinc Acetate Preserved<br>ENFM204 | P = Unpreserved Plastic; N = Nitric Preserved Plastic; N = Nitric Preserved; VB = VOA Vial Sodium Bisulphate Preserved Bottle; E = EDTA Preserved Bottle; ST = | ved Plastic; ORC = Nitric Prese<br>rved; VS = VOA Vial Sulfuric P<br>Sterile Bottle; ASS = Plastic Be | rved ORC; SH =<br>eserved; AV = Air<br>g for Acid Sulpha | Sodium Hydroxide/Cd Pres<br>freight Unpreserved Vial So<br>te Soils; B = Unpreserved E | erved; S = Sodium I<br>G = Sulfuric Preserv<br>lag | Hydroxide Pre<br>ed Amber Gla | served Plastic<br>ass; H = HCI | c; AG = Ambe<br>preserved Pl | er Glass Unpre<br>astic; HS = H | served; AP -<br>CI preserved | Airfreight Unpres<br>Speciation bottle; | erved Plastic<br>SP = Sulfuric Pres | erved Plastic; F = | Formaldehyde Preserved Glass;   |



# **CERTIFICATE OF ANALYSIS**

| Work Order              | EW2300847                                     | Page                    | : 1 of 4   |  |  |  |  |  |
|-------------------------|---|-------------------------|--|--|--|--|--|--|
| Client                  | SHELLHARBOUR CITY COUNCIL                     | Laboratory              | Environmental Division NSW South Coast                     |  |  |  |  |  |
| Contact                 | : Ryan Stirling                               | Contact                 | : Aneta Prosaroski   |  |  |  |  |  |
| Address                 | : LAMERTON HOUSE, LAMERTON CRESCENT           | Address                 | : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia |  |  |  |  |  |
|                         | SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529 |                         |  |  |  |  |  |  |
| Telephone               | :   | Telephone               | : +61 2 4225 3125  |  |  |  |  |  |
| Project                 | : Dunmore Quarterly Leachate Tank EPL         | Date Samples Received   | : 01-Mar-2023 15:41  |  |  |  |  |  |
| Order number            | : 147649                                      | Date Analysis Commenced | : 01-Mar-2023  |  |  |  |  |  |
| C-O-C number            | :   | Issue Date              | : 13-Mar-2023 11:38  |  |  |  |  |  |
| Sampler                 | : Robert DaLio                                |                         | HALA NALA  |  |  |  |  |  |
| Site                    | : DUNMORE LANDFILL TENDER                     |                         |  |  |  |  |  |  |
| Quote number            | : WO/030/19 TENDER LEACHATE                   |                         | Accorditation No. 925                                      |  |  |  |  |  |
| No. of samples received | : 1   |                         | Accredited for compliance with                             |  |  |  |  |  |
| No. of samples analysed | :1  |                         | ISO/IEC 17025 - Testing                                    |  |  |  |  |  |

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

#### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| Signatories      | Position                              | Accreditation Category             |
|------------------|---------------------------------------|------------------------------------|
| Aneta Prosaroski | Environmental Services Representative | Laboratory - Wollongong, NSW       |
| Ankit Joshi      | Senior Chemist - Inorganics           | Sydney Inorganics, Smithfield, NSW |



#### **General Comments**

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- Analytical work for this work order will be conducted at ALS Sydney.
- EK059G, EK057G: NOx and Nitrite on sample no:1 confirmed by re-analysis.
- ED041G: LOR raised for Sulfate due to sample matrix
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Temperature performed by ALS Wollongong via in-house method EA116 and EN67 PK.
- Dissolved oxygen (DO) performed by ALS Wollongong via in-house method EA025FD and EN67 PK.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.10 Wastewaters
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.</li>



| Sub-Matrix: WATER<br>(Matrix: WATER)         |                |        | Sample ID      | Leachate Storage  | <br> | <br> |
|--|----------------|--------|----------------|-------------------|------|------|
|  |                |        |                | I P1              |      |      |
|  |                | Sampli | ng date / time | 01-Mar-2023 00:00 | <br> | <br> |
| Compound                                     | CAS Number     | LOR    | Unit           | EW2300847-001     | <br> | <br> |
|  |                |        |                | Result            | <br> | <br> |
| EA005FD: Field pH                            |                |        |                |                   |      |      |
| рН   |                | 0.1    | pH Unit        | 9.4               | <br> | <br> |
| EA010FD: Field Conductivity                  |                |        |                |                   |      |      |
| Electrical Conductivity (Non<br>Compensated) |                | 1      | μS/cm          | 9260              | <br> | <br> |
| EA015: Total Dissolved Solids dried at 180   | ) ± 5 °C       |        |                |                   |      |      |
| Total Dissolved Solids @180°C                |                | 10     | mg/L           | 5370              | <br> | <br> |
| EA116: Temperature                           |                |        |                |                   |      |      |
| Temperature                                  |                | 0.1    | °C             | 24.8              | <br> | <br> |
| ED037P: Alkalinity by PC Titrator            |                |        |                |                   |      |      |
| Hydroxide Alkalinity as CaCO3                | DMO-210-001    | 1      | mg/L           | <1                | <br> | <br> |
| Carbonate Alkalinity as CaCO3                | 3812-32-6      | 1      | mg/L           | 1080              | <br> | <br> |
| Bicarbonate Alkalinity as CaCO3              | 71-52-3        | 1      | mg/L           | 2060              | <br> | <br> |
| Total Alkalinity as CaCO3                    |                | 1      | mg/L           | 3150              | <br> | <br> |
| ED041G: Sulfate (Turbidimetric) as SO4 2-    | by DA          |        |                |                   |      |      |
| Sulfate as SO4 - Turbidimetric               | 14808-79-8     | 1      | mg/L           | <20               | <br> | <br> |
| ED045G: Chloride by Discrete Analyser        |                |        |                |                   |      |      |
| Chloride                                     | 16887-00-6     | 1      | mg/L           | 1460              | <br> | <br> |
| ED093F: Dissolved Major Cations              |                |        |                |                   |      |      |
| Calcium                                      | 7440-70-2      | 1      | mg/L           | 37                | <br> | <br> |
| Potassium                                    | 7440-09-7      | 1      | mg/L           | 393               | <br> | <br> |
| EG020T: Total Metals by ICP-MS               |                |        |                |                   |      |      |
| Manganese                                    | 7439-96-5      | 0.001  | mg/L           | 0.092             | <br> | <br> |
| Iron   | 7439-89-6      | 0.05   | mg/L           | 1.24              | <br> | <br> |
| EK040P: Fluoride by PC Titrator              |                |        |                |                   |      |      |
| Fluoride                                     | 16984-48-8     | 0.1    | mg/L           | 0.2               | <br> | <br> |
| EK055G: Ammonia as N by Discrete Analy       | vser           |        |                |                   |      |      |
| Ammonia as N                                 | 7664-41-7      | 0.01   | mg/L           | 432               | <br> | <br> |
| EK057G: Nitrite as N by Discrete Analyse     | r              |        |                |                   |      |      |
| Nitrite as N                                 | 14797-65-0     | 0.01   | mg/L           | 2.16              | <br> | <br> |
| EK058G: Nitrate as N by Discrete Analyse     | er             |        |                |                   |      |      |
| Nitrate as N                                 | 14797-55-8     | 0.01   | mg/L           | <0.10             | <br> | <br> |
| EK059G: Nitrite plus Nitrate as N (NOx) b    | y Discrete Ana | lyser  |                |                   |      |      |



| Sub-Matrix: WATER<br>(Matrix: WATER)      |                 |            | Sample ID      | Leachate Storage<br>Tank<br>LP1 | <br> | <br> |
|---|-----------------|------------|----------------|---------------------------------|------|------|
|   |                 | Sampli     | ng date / time | 01-Mar-2023 00:00               | <br> | <br> |
| Compound                                  | CAS Number      | LOR        | Unit           | EW2300847-001                   | <br> | <br> |
|   |                 |            |                | Result                          | <br> | <br> |
| EK059G: Nitrite plus Nitrate as N (NOx) t | by Discrete Ana | lyser - Co | ntinued        |                                 |      |      |
| Nitrite + Nitrate as N                    |                 | 0.01       | mg/L           | 0.20                            | <br> | <br> |
| EP005: Total Organic Carbon (TOC)         |                 |            |                |                                 |      |      |
| Total Organic Carbon                      |                 | 1          | mg/L           | 373                             | <br> | <br> |
| EP025FD: Field Dissolved Oxygen           |                 |            |                |                                 |      |      |
| Dissolved Oxygen                          |                 | 0.01       | mg/L           | 5.66                            | <br> | <br> |
| Dissolved Oxygen - % Saturation           |                 | 0.1        | % saturation   | 70.5                            | <br> | <br> |

### Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) ED093F: Dissolved Major Cations

(WATER) EP005: Total Organic Carbon (TOC)

(WATER) EK055G: Ammonia as N by Discrete Analyser

(WATER) EG020T: Total Metals by ICP-MS

(WATER) EK057G: Nitrite as N by Discrete Analyser

(WATER) EK058G: Nitrate as N by Discrete Analyser

(WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser

(WATER) EA015: Total Dissolved Solids dried at 180 ± 5 °C

(WATER) ED045G: Chloride by Discrete Analyser

(WATER) ED037P: Alkalinity by PC Titrator

(WATER) EK040P: Fluoride by PC Titrator

(WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA



Appendix D:

Laboratory Chain of Custody (COC) & Certificates of Analysis

(COA) – Water Samples – Quarter 3

| FICE:               |                                 |                           | 10101040                                   |   | ard IAI IList    | due date):  |   |  |                       |                    | EOR                                   | LABORATORY USE   | DNLY (Circle)  |
|---------------------|---------------------------------|---------------------------|--|---|------------------|-------------|---|--|-----------------------|--------------------|---------------------------------------|--|--|
| OJECT:              | 41 Burelli St WOLLONGONG NSW 2  | 2500                      | (Standard T                                | T may be longer for some tests                | tandard or urg   | gent TAT (L | _ist due date}:                               |  |                       |                    | Gusto                                 | xdy Seal Intext?   | Yes) No I  |
|                     | Dunmore Quarterly Ground Waters | SEPL                      | ALS QUO                                    | TE NO.: WO/030/19 TENDI                       | ER               |             |   | COC SEQ  |                       | ER (Circle)        | Free                                  | ice / frozen ice bricks pres<br>st?                          | ert upon   |
| DER NUMBER:         |                                 |                           | COC: 1 2 3 4                               |   |                  |             |   |  | 56                    | 7 Rand             | om Sample Temperature i               | on Receipt:  |  |
| OJECT MANAGER:      | Ryan Stirling                   |                           |  |   |                  |             | OF:   | 1 2  | 34                    | 56                 | 7 Other                               | GUIRTIERIC   |  |
| MPLER: Koba         | et Dalis/M                      | Sampler 1                 | MOBILE:                                    |   | SHED BY:         | $\sim$ /    | RECE  | EIVED BY:  | <b>G</b>              |                    | RELINQUI                              | SHED BY:   | RECEIVED BY:   |
| C emailed to ALS? ( | YES / NO)                       | EDD FORM                  | AT (or detau                               |   | cert o           | AL,         |   | ner  | 4                     |                    | DATECTIM                              | <b>-</b> .   |  |
| all Invoice to :    |                                 |                           |  | 2.6   | .2               | 3           |   | 7161   | 23                    | 14:6               |                                       | • • • •  | DATE/TIME.   |
| MMENTS/SPECIAL I    | HANDLING/STORAGE OR DISPOSA     | L: CC reports to          | <br>:                                      |   | •                |             |   |  | -                     | 1 1 • •            |                                       |  |  |
|                     |                                 |                           | ·<br>· · · · · · · · · · · · · · · · · · · |   |                  | -           |   |  |                       |                    |                                       |  |  |
| ALS USE ONLY        | SAMPLE<br>MATRIX: Sol           | DETAILS<br>Id(S) Water(W) |  | CONTAINER INFORMATION                         |                  | ANAL T      | re Metais are requ                            | ired, specify T  | otal (unfiltered b    | NB, Suite Co       | aes must be lis<br>r Dissolved (field | sted to attract suite price)<br>I filtered bottle required). | Additional Information   |
| LAB ID              | LABID SAMPLE ID DATE / TIME M   |                           |  | TYPE & PRESERVATIVE<br>(refer to codes below) | TOTAL<br>BOTTLES | umonia (    | NT-2A (Alka,<br>to4, Cl, Fl)<br>iltered Ca, K | n-za (arka,<br>da, Cl, Fl)<br>Itered Ca, K<br>OC<br>OC<br>issolved Fe &<br>n |                       | IT-4 (NO2,<br>103) | commor san                            |  | Comments on likely contaminant levels, diut<br>or samples requiring specific QC analysis etc |
|                     | внас 2                          | (-23 g:#                  | > w  |   |                  | ∢           | <u>- 67 ⊞</u>                                 | ⊢<br>✓   | <u>□</u> ≥<br>✓       | <u>∠∠</u><br>√     | юш                                    |  | Field Tests - pH, EC, Temp & S   |
|                     | BH3                             | 1 12:50                   | w  |   |                  | 1           | 1   | 1  | 1                     | 1                  |                                       |  | Field Tests - pH, EC, Temp & S   |
|                     | BH4                             | 12:2=                     | , w  |   |                  | 1           | 1   | 1  | 1                     | 1                  |                                       |  | Field Tests - pH, EC, Temp & S   |
|                     | ВН9                             | 8:55                      | w  |   |                  | 4           | 1   | <b>1</b>   | 1                     | 1                  |                                       |  | Field Tests - pH, EC, Temp & S   |
|                     | BH12R                           | 11:23                     | w ·  |   |                  | 1           | 1   | . 🖌  | *                     | 1                  |                                       |  | Field Tests - pH, EC, Temp & S   |
|                     | BH13                            | 11:50                     | > w  |   |                  | 1           | 1   | 4  | . 1                   | 1                  |                                       |  | Field Tests - pH, EC, Temp & S   |
|                     | BH14                            | 12:05                     | w  |   |                  | 1           | 1   | 1  | 1                     | 1                  |                                       |  | Field Tests - pH, EC, Temp & S   |
|                     | BH15                            | (1:10                     | w  |   |                  | 1           | 4   | 1  | ×                     | 1                  |                                       |  | Field Tests - pH, EC, Temp & S   |
|                     | BH19R                           | (3:05                     | w  | Environmental Divisio                         | ้า               | 1           | 1   | 1  | 1                     | 1                  |                                       |  | Field Tests - pH, EC, Temp & S   |
|                     | BH18                            | 10:25                     | w  | Wollongong<br>Work Order Reference            |                  |             | 1   | 1  | 1                     | 1                  |                                       |  | Field Tests - pH, EC, Temp & \$  |
|                     | BH21                            | 10:45                     | , w  | EW230241                                      | 6                | 1           | 1   | 1  | 1                     |                    |                                       |  | Field Tests - pH, EC, Temp & S   |
|                     | BH22                            | 9:25                      | w  |   | 01               |             | 1   |  | <ul> <li>✓</li> </ul> | •                  |                                       |  | Field Tests - pH, EC, Temp & S   |
|                     | Duplicate                       | 10.15                     | w  |   |                  |             | 1   | 4  |                       | 1                  |                                       |  | Field Tests - pH, EC, Temp & S   |
|                     | Triplicate                      | 10:25                     | w  |   |                  | :           |   |  |                       |                    | <b>~</b>                              |  |  |
|                     |                                 |                           |  | Telephone : 02 42253125                       |                  |             |   |  |                       |                    |                                       |  |  |
|                     |                                 |                           |  |   |                  |             |   |  |                       |                    |                                       |  |  |

V = VOA Vial HCI Preserved; VB = VOA Vial Sodium Bisulphate Preserved; SV = VOA Vial Sulfuric Preserved; AV = Alfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCI preserved Plastic; HS = HCI preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.



# **CERTIFICATE OF ANALYSIS**

| Work Order              | EW2302416                                     | Page                    | : 1 of 8   |
|-------------------------|---|-------------------------|--|
| Client                  | SHELLHARBOUR CITY COUNCIL                     | Laboratory              | Environmental Division NSW South Coast                     |
| Contact                 | : Ryan Stirling                               | Contact                 | : Aneta Prosaroski   |
| Address                 | : LAMERTON HOUSE, LAMERTON CRESCENT           | Address                 | : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia |
|                         | SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529 |                         |  |
| Telephone               | :   | Telephone               | : +61 2 4225 3125  |
| Project                 | : Dunmore Quarterly Groundwaters EPL          | Date Samples Received   | : 02-Jun-2023 14:09  |
| Order number            | : 147649                                      | Date Analysis Commenced | : 02-Jun-2023  |
| C-O-C number            | :   | Issue Date              | : 15-Jun-2023 17:48  |
| Sampler                 | : Michael Santos, Robert DaLio                |                         | Hac-MRA NATA   |
| Site                    | DUNMORE LANDFILL TENDER                       |                         |  |
| Quote number            | : WO/030/19 TENDER GROUNDWATERS               |                         | The Contraction of the second                              |
| No. of samples received | : 14  |                         | Accreditation No. 825<br>Accredited for compliance with    |
| No. of samples analysed | : 13  |                         | ISO/IEC 17025 - Testing                                    |

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

#### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| Signatories  | Position                    | Accreditation Category             |
|--------------|-----------------------------|------------------------------------|
| Ankit Joshi  | Senior Chemist - Inorganics | Sydney Inorganics, Smithfield, NSW |
| Dian Dao     | Senior Chemist - Inorganics | Sydney Inorganics, Smithfield, NSW |
| Ivan Taylor  | Analyst                     | Sydney Inorganics, Smithfield, NSW |
| Robert DaLio | Sampler                     | Laboratory - Wollongong, NSW       |



#### **General Comments**

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- Analytical work for this work order will be conducted at ALS Sydney.
- ED041G: LOR raised for Sulfate due to sample matrix
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Sampling and groundwater depth measurements completed by ALS Wollongong via inhouse sampling method EN/67.11 Groundwater Sampling Via High Flow and Bailer Method.
- Temperature performed by ALS Wollongong via in-house method EA116 and EN67 PK.
- Sample collection of Ground Waters by in-house EN67 where the "surface layer of the aquifer was sampled".
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.



| Sub-Matrix: WATER<br>(Matrix: WATER)         |                 |       | Sample ID       | BH1C              | BH3               | BH4               | BH9               | BH12R             |
|--|-----------------|-------|-----------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|  |                 | Sampl | ing date / time | 02-Jun-2023 09:40 | 02-Jun-2023 12:50 | 02-Jun-2023 12:25 | 02-Jun-2023 08:55 | 02-Jun-2023 11:23 |
| Compound                                     | CAS Number      | LOR   | Unit            | EW2302416-001     | EW2302416-002     | EW2302416-003     | EW2302416-004     | EW2302416-005     |
|  |                 |       |                 | Result            | Result            | Result            | Result            | Result            |
| EA005FD: Field pH                            |                 |       |                 |                   |                   |                   |                   |                   |
| рН   |                 | 0.1   | pH Unit         | 7.0               | 7.5               | 7.4               | 7.2               | 6.8               |
| EA010FD: Field Conductivity                  |                 |       |                 |                   |                   |                   |                   |                   |
| Electrical Conductivity (Non<br>Compensated) |                 | 1     | µS/cm           | 7945              | 1200              | 751               | 4120              | 1930              |
| EA116: Temperature                           |                 |       |                 |                   |                   |                   |                   |                   |
| Temperature                                  |                 | 0.5   | °C              | 25.9              | 18.9              | 18.9              | 18.0              | 21.1              |
| ED037P: Alkalinity by PC Titrator            |                 |       |                 |                   |                   |                   |                   |                   |
| Hydroxide Alkalinity as CaCO3                | DMO-210-001     | 1     | mg/L            | <1                | <1                | <1                | <1                | <1                |
| Carbonate Alkalinity as CaCO3                | 3812-32-6       | 1     | mg/L            | <1                | <1                | <1                | <1                | <1                |
| Bicarbonate Alkalinity as CaCO3              | 71-52-3         | 1     | mg/L            | 2600              | 370               | 310               | 1790              | 571               |
| Total Alkalinity as CaCO3                    |                 | 1     | mg/L            | 2600              | 370               | 310               | 1790              | 571               |
| ED041G: Sulfate (Turbidimetric) as SO4 2     | 2- by DA        |       |                 |                   |                   |                   |                   |                   |
| Sulfate as SO4 - Turbidimetric               | 14808-79-8      | 1     | mg/L            | <10               | 146               | 70                | 50                | 178               |
| ED045G: Chloride by Discrete Analyser        |                 |       |                 |                   |                   |                   |                   |                   |
| Chloride                                     | 16887-00-6      | 1     | mg/L            | 970               | 123               | 35                | 516               | 246               |
| ED093F: Dissolved Major Cations              |                 |       |                 |                   |                   |                   |                   |                   |
| Calcium                                      | 7440-70-2       | 1     | mg/L            | 116               | 101               | 94                | 181               | 185               |
| Potassium                                    | 7440-09-7       | 1     | mg/L            | 207               | 31                | 16                | 76                | 27                |
| EG020F: Dissolved Metals by ICP-MS           |                 |       |                 |                   |                   |                   |                   |                   |
| Manganese                                    | 7439-96-5       | 0.001 | mg/L            | 0.103             | 0.082             | 0.097             | 0.708             | 0.532             |
| Iron   | 7439-89-6       | 0.05  | mg/L            | 11.6              | 0.27              | 2.59              | 0.89              | 9.38              |
| EK040P: Fluoride by PC Titrator              |                 |       |                 |                   |                   |                   |                   |                   |
| Fluoride                                     | 16984-48-8      | 0.1   | mg/L            | 0.5               | 0.2               | 0.1               | 0.6               | 0.3               |
| EK055G: Ammonia as N by Discrete Ana         | lyser           |       |                 |                   |                   |                   |                   |                   |
| Ammonia as N                                 | 7664-41-7       | 0.01  | mg/L            | 298               | 12.3              | 2.04              | 141               | 3.59              |
| EK057G: Nitrite as N by Discrete Analys      | er              |       |                 |                   |                   |                   |                   |                   |
| Nitrite as N                                 | 14797-65-0      | 0.01  | mg/L            | <0.01             | 0.13              | <0.01             | <0.01             | 0.07              |
| EK058G: Nitrate as N by Discrete Analys      | ser             |       |                 |                   |                   |                   |                   |                   |
| Nitrate as N                                 | 14797-55-8      | 0.01  | mg/L            | <0.01             | 1.37              | <0.01             | 0.03              | 0.39              |
| EK059G: Nitrite plus Nitrate as N (NOx)      | by Discrete Ana | lyser |                 |                   |                   |                   |                   |                   |
| Nitrite + Nitrate as N                       |                 | 0.01  | mg/L            | <0.01             | 1.50              | <0.01             | 0.03              | 0.46              |
| EP005: Total Organic Carbon (TOC)            |                 |       |                 |                   |                   |                   |                   |                   |
| Total Organic Carbon                         |                 | 1     | mg/L            | 186               | 22                | 10                | 76                | 24                |



| Sub-Matrix: WATER<br>(Matrix: WATER)  |            |        | Sample ID      | BH1C              | BH3               | BH4               | BH9               | BH12R             |
|---------------------------------------|------------|--------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                                       |            | Sampli | ng date / time | 02-Jun-2023 09:40 | 02-Jun-2023 12:50 | 02-Jun-2023 12:25 | 02-Jun-2023 08:55 | 02-Jun-2023 11:23 |
| Compound                              | CAS Number |        | Unit           | EW2302416-001     | EW2302416-002     | EW2302416-003     | EW2302416-004     | EW2302416-005     |
|                                       |            |        |                | Result            | Result            | Result            | Result            | Result            |
| QWI-EN 67.11 Sampling of Groundwaters |            |        |                |                   |                   |                   |                   |                   |
| Standing Water Level                  |            | 0.01   | m AHD          | 3.09              | 3.08              | 4.28              | 3.86              | 4.25              |



| Sub-Matrix: WATER<br>(Matrix: WATER)         |                 |        | Sample ID      | BH13              | BH14              | BH15              | BH19R             | BH18              |
|--|-----------------|--------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|  |                 | Sampli | ng date / time | 02-Jun-2023 11:50 | 02-Jun-2023 12:05 | 02-Jun-2023 11:10 | 02-Jun-2023 13:05 | 02-Jun-2023 10:25 |
| Compound                                     | CAS Number      | LOR    | Unit           | EW2302416-006     | EW2302416-007     | EW2302416-008     | EW2302416-009     | EW2302416-010     |
|  |                 |        |                | Result            | Result            | Result            | Result            | Result            |
| EA005FD: Field pH                            |                 |        |                |                   |                   |                   |                   |                   |
| рН   |                 | 0.1    | pH Unit        | 6.8               | 6.9               | 7.0               | 7.4               | 6.8               |
| EA010FD: Field Conductivity                  |                 |        |                |                   |                   |                   |                   |                   |
| Electrical Conductivity (Non<br>Compensated) |                 | 1      | µS/cm          | 2260              | 958               | 2250              | 731               | 511               |
| EA116: Temperature                           |                 |        |                |                   |                   |                   |                   |                   |
| Temperature                                  |                 | 0.5    | °C             | 21.9              | 21.1              | 17.1              | 18.9              | 20.7              |
| ED037P: Alkalinity by PC Titrator            |                 |        |                |                   |                   |                   |                   |                   |
| Hydroxide Alkalinity as CaCO3                | DMO-210-001     | 1      | mg/L           | <1                | <1                | <1                | <1                | <1                |
| Carbonate Alkalinity as CaCO3                | 3812-32-6       | 1      | mg/L           | <1                | <1                | <1                | <1                | <1                |
| Bicarbonate Alkalinity as CaCO3              | 71-52-3         | 1      | mg/L           | 812               | 422               | 507               | 336               | 267               |
| Total Alkalinity as CaCO3                    |                 | 1      | mg/L           | 812               | 422               | 507               | 336               | 267               |
| ED041G: Sulfate (Turbidimetric) as SO4 2     | 2- by DA        |        |                |                   |                   |                   |                   |                   |
| Sulfate as SO4 - Turbidimetric               | 14808-79-8      | 1      | mg/L           | 67                | 50                | 366               | 39                | <10               |
| ED045G: Chloride by Discrete Analyser        |                 |        |                |                   |                   |                   |                   |                   |
| Chloride                                     | 16887-00-6      | 1      | mg/L           | 308               | 36                | 340               | 38                | 16                |
| ED093F: Dissolved Major Cations              |                 |        |                |                   |                   |                   |                   |                   |
| Calcium                                      | 7440-70-2       | 1      | mg/L           | 213               | 106               | 112               | 74                | 60                |
| Potassium                                    | 7440-09-7       | 1      | mg/L           | 29                | 12                | 138               | 49                | 10                |
| EG020F: Dissolved Metals by ICP-MS           |                 |        |                |                   |                   |                   |                   |                   |
| Manganese                                    | 7439-96-5       | 0.001  | mg/L           | 0.409             | 0.123             | 0.260             | 0.063             | 0.067             |
| Iron   | 7439-89-6       | 0.05   | mg/L           | 3.40              | 0.05              | 9.12              | 1.06              | 1.31              |
| EK040P: Fluoride by PC Titrator              |                 |        |                |                   |                   |                   |                   |                   |
| Fluoride                                     | 16984-48-8      | 0.1    | mg/L           | 0.2               | 0.7               | 0.2               | 0.2               | 0.2               |
| EK055G: Ammonia as N by Discrete Anal        | lyser           |        |                |                   |                   |                   |                   |                   |
| Ammonia as N                                 | 7664-41-7       | 0.01   | mg/L           | 9.59              | 1.40              | 8.74              | 1.85              | 1.05              |
| EK057G: Nitrite as N by Discrete Analyse     | er              |        |                |                   |                   |                   |                   |                   |
| Nitrite as N                                 | 14797-65-0      | 0.01   | mg/L           | 0.02              | 0.06              | <0.01             | <0.01             | <0.01             |
| EK058G: Nitrate as N by Discrete Analys      | er              |        |                |                   |                   |                   |                   |                   |
| Nitrate as N                                 | 14797-55-8      | 0.01   | mg/L           | 0.37              | 5.94              | 0.01              | <0.01             | <0.01             |
| EK059G: Nitrite plus Nitrate as N (NOx)      | by Discrete Ana | lyser  |                |                   |                   |                   |                   |                   |
| Nitrite + Nitrate as N                       |                 | 0.01   | mg/L           | 0.39              | 6.00              | 0.01              | <0.01             | <0.01             |
| EP005: Total Organic Carbon (TOC)            |                 |        |                |                   |                   |                   |                   |                   |
| Total Organic Carbon                         |                 | 1      | mg/L           | 38                | 12                | 39                | 14                | 14                |



| Sub-Matrix: WATER<br>(Matrix: WATER)  |            |        | Sample ID      | BH13              | BH14              | BH15              | BH19R             | BH18              |
|---------------------------------------|------------|--------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                                       |            | Sampli | ng date / time | 02-Jun-2023 11:50 | 02-Jun-2023 12:05 | 02-Jun-2023 11:10 | 02-Jun-2023 13:05 | 02-Jun-2023 10:25 |
| Compound                              | CAS Number |        | Unit           | EW2302416-006     | EW2302416-007     | EW2302416-008     | EW2302416-009     | EW2302416-010     |
|                                       |            |        |                | Result            | Result            | Result            | Result            | Result            |
| QWI-EN 67.11 Sampling of Groundwaters |            |        |                |                   |                   |                   |                   |                   |
| Standing Water Level                  |            | 0.01   | m AHD          | 4.22              | 4.64              | 0.68              | 4.54              | 2.26              |



| Sub-Matrix: WATER<br>(Matrix: WATER)         |                 |        | Sample ID       | BH21              | BH22                                  | Duplicate         | <br> |
|--|-----------------|--------|-----------------|-------------------|---------------------------------------|-------------------|------|
|  |                 | Sampli | ing date / time | 02-Jun-2023 10:45 | 02-Jun-2023 09:25                     | 02-Jun-2023 10:25 | <br> |
| Compound                                     | CAS Number      | LOR    | Unit            | EW2302416-011     | EW2302416-012                         | EW2302416-013     | <br> |
|  |                 |        |                 | Result            | Result                                | Result            | <br> |
| EA005FD: Field pH                            |                 |        |                 |                   |                                       |                   |      |
| рН   |                 | 0.1    | pH Unit         | 7.2               | 7.3                                   | 6.8               | <br> |
| EA010FD: Field Conductivity                  |                 |        |                 |                   |                                       |                   |      |
| Electrical Conductivity (Non<br>Compensated) |                 | 1      | µS/cm           | 2550              | 1580                                  | 511               | <br> |
| EA116: Temperature                           |                 |        |                 |                   |                                       |                   |      |
| Temperature                                  |                 | 0.5    | °C              | 22.6              | 19.2                                  | 20.7              | <br> |
| ED037P: Alkalinity by PC Titrator            |                 |        |                 |                   |                                       |                   |      |
| Hydroxide Alkalinity as CaCO3                | DMO-210-001     | 1      | mg/L            | <1                | <1                                    | <1                | <br> |
| Carbonate Alkalinity as CaCO3                | 3812-32-6       | 1      | mg/L            | <1                | <1                                    | <1                | <br> |
| Bicarbonate Alkalinity as CaCO3              | 71-52-3         | 1      | mg/L            | 854               | 424                                   | 268               | <br> |
| Total Alkalinity as CaCO3                    |                 | 1      | mg/L            | 854               | 424                                   | 268               | <br> |
| ED041G: Sulfate (Turbidimetric) as SO4       | 2- by DA        |        |                 |                   |                                       |                   |      |
| Sulfate as SO4 - Turbidimetric               | 14808-79-8      | 1      | mg/L            | 114               | 224                                   | <10               | <br> |
| ED045G: Chloride by Discrete Analyser        |                 |        |                 |                   |                                       |                   |      |
| Chloride                                     | 16887-00-6      | 1      | mg/L            | 353               | 183                                   | 16                | <br> |
| ED093F: Dissolved Major Cations              |                 |        |                 |                   |                                       |                   |      |
| Calcium                                      | 7440-70-2       | 1      | mg/L            | 125               | 87                                    | 61                | <br> |
| Potassium                                    | 7440-09-7       | 1      | mg/L            | 16                | 18                                    | 10                | <br> |
| EG020F: Dissolved Metals by ICP-MS           |                 |        |                 |                   |                                       |                   |      |
| Manganese                                    | 7439-96-5       | 0.001  | mg/L            | 0.473             | 0.067                                 | 0.068             | <br> |
| Iron   | 7439-89-6       | 0.05   | mg/L            | 0.76              | 0.96                                  | 1.33              | <br> |
| EK040P: Fluoride by PC Titrator              |                 |        |                 |                   |                                       |                   |      |
| Fluoride                                     | 16984-48-8      | 0.1    | mg/L            | 0.4               | 0.8                                   | 0.2               | <br> |
| EK055G: Ammonia as N by Discrete Ana         | alyser          |        |                 |                   |                                       |                   |      |
| Ammonia as N                                 | 7664-41-7       | 0.01   | mg/L            | 3.60              | 4.11                                  | 1.06              | <br> |
| EK057G: Nitrite as N by Discrete Analys      | ser             |        |                 |                   |                                       |                   |      |
| Nitrite as N                                 | 14797-65-0      | 0.01   | mg/L            | <0.01             | <0.01                                 | <0.01             | <br> |
| EK058G: Nitrate as N by Discrete Analy       | ser             |        |                 |                   | · · · · · · · · · · · · · · · · · · · |                   |      |
| Nitrate as N                                 | 14797-55-8      | 0.01   | mg/L            | <0.01             | <0.01                                 | <0.01             | <br> |
| EK059G: Nitrite plus Nitrate as N (NOx)      | by Discrete Ana | lyser  |                 |                   |                                       |                   |      |
| Nitrite + Nitrate as N                       |                 | 0.01   | mg/L            | <0.01             | <0.01                                 | <0.01             | <br> |
| EP005: Total Organic Carbon (TOC)            |                 |        |                 |                   |                                       |                   |      |
| Total Organic Carbon                         |                 | 1      | mg/L            | 38                | 26                                    | 14                | <br> |



| Sub-Matrix: WATER<br>(Matrix: WATER)  |                |         | Sample ID      | BH21              | BH22              | Duplicate         | <br> |
|---------------------------------------|----------------|---------|----------------|-------------------|-------------------|-------------------|------|
|                                       |                | Samplii | ng date / time | 02-Jun-2023 10:45 | 02-Jun-2023 09:25 | 02-Jun-2023 10:25 | <br> |
| Compound                              | CAS Number LOR |         | Unit           | EW2302416-011     | EW2302416-012     | EW2302416-013     | <br> |
|                                       |                |         |                | Result            | Result            | Result            | <br> |
| QWI-EN 67.11 Sampling of Groundwaters |                |         |                |                   |                   |                   |      |
| Standing Water Level                  |                | 0.01    | m AHD          | 3.01              | 2.40              | 2.26              | <br> |

#### Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) ED093F: Dissolved Major Cations

(WATER) EP005: Total Organic Carbon (TOC)

(WATER) EK055G: Ammonia as N by Discrete Analyser

(WATER) EG020F: Dissolved Metals by ICP-MS

(WATER) EK057G: Nitrite as N by Discrete Analyser

(WATER) EK058G: Nitrate as N by Discrete Analyser

(WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser

(WATER) ED045G: Chloride by Discrete Analyser

(WATER) ED037P: Alkalinity by PC Titrator

(WATER) EK040P: Fluoride by PC Titrator

(WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA



#### CHAIN OF CUSTODY ALS Laboratory: please tick ->

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| CLIENT:<br>OFFICE:  | Shellharbour City Council<br>41 Burelli St WOLLONGONG NSW 2500 | TURNAROUND REQUIREMEN<br>(Standard TAT may be longer for some<br>e.g Ultra Trace Organics) | TS:       □       Standard TAT (List due date):         e tests       □       Non Standard or urgent TAT (List date): | FOR LABORATORY USE ONLY<br>Custody Seal Inter? | Circles   |              |
|---------------------|--|--|---|--|---|--------------|
| PROJECT:            | Dunmore Quarterly Surface Waters EPL                           | ALS QUOTE NO.: WO/030/19   | TENDER  | COC SEQUENCE NUMBER (Circle)                   | Free Ice / fm2ph Tok bricks present up<br>recent? | IN TO NA     |
| ORDER NUMBER:       |  |  |   | COC: 1 2 3 4 5 6                               | 7 Random Sample Temperature on Rec                | eio: 👗 🥑 rc  |
| PROJECT MANAGER     | R: Ryan Stirling   |  |   | OF: 1 2 3 4 5 6                                | 7 Other comment                                   |              |
| SAMPLER:            | DALIO/M. Sontas SAMPLE   | R MOBILE:  | RELINQUISHED BY:  | RECEIXED BY:                                   | RELINQUISHED BY:                                  | RECEIVED BY: |
| COC emailed to ALS' | ? (YES / NO) EDD FO  | RMAT (or default):   | R.OA LOU  | Inela  |   |              |
| Email Reports to :  |  |  |   | DATE/ŢIMĘ:                                     | DATE/TIME:  | DATE/TIME:   |
| Email Invoice to :  |  |  | 11.6.23   | 1/6/23   |   |              |

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: CC reports to:

| ALS USE ONLY   | SAMPLE<br>MATRIX: Sol  | E DETAILS<br>lid(S) Water(W)   |   | CONTAINER INFORMATIC  | N                                  | ANALY                        | 'SIS REQUIR<br>9 Metals are requ | ED Includia                   | ng SUITES                             | (NB. Suite Coo<br>pottle required) or | les must be lis<br>Dissolved (field           | sted to attract suite price) | Additional Information<br>Comments on likely contaminant levels,<br>dilutions, or samples requiring specific QC<br>analysis etc. |
|--|--|--|---|---|------------------------------------|------------------------------|----------------------------------|-------------------------------|---------------------------------------|---------------------------------------|---|------------------------------|--|
| LAB ID   | SAMPLE ID  | DATE / TIME  | MATRIX  | TYPE & PRESERVATIVE<br>(refer to codes below)   | TOTAL<br>BOTTLES                   | ISS                          | VT-1, NT-2A<br>(Ionic Balance)   | FOC, NT-4, NH3, Total Mn      | <b>Dissolved and Total Fe</b>         | Lurbidity                             | 4H3, NH4 & NO3                                | rss, TDS, TOC, Total Mn      |  |
|  | SWP1 5   | 1/6/23 9:40  | w   | · · · ·   |                                    | 1                            | 1                                | 4                             | <br>✓                                 |                                       |   |                              | Field Tests - pH, EC, DO & Temp  |
|  | SWC_2  | 1 11:00  | w   |   |                                    |                              | 1                                |                               | 1                                     | 1                                     | 1   | 1                            | Field Tests - pH, EC, DO & Temp  |
|  | SWC_UP   | 10:43  | w   |   |                                    |                              | 1                                |                               | ₹.                                    | 1                                     | 1   | 1                            | Field Tests - pH, EC, DO & Temp  |
|  | SWC_DOWN   | 11/10  | w   |   |                                    |                              | 1                                |                               | 1                                     | 1                                     | 1   | 1                            | Field Tests - pH, EC, DO & Temp  |
|  | SWC_DOWN_2   | 11'20  | w   |   |                                    |                              | *                                |                               | 1                                     | 1                                     | 1   | ×                            | Field Tests - pH, EC, DO & Temp  |
|  | Duplicate  | 1 11:00  | w   |   |                                    |                              | 1                                |                               | 1                                     | 1                                     | 1   | 1                            | Field Tests - pH, EC, DO & Temp  |
|  |  |  |   |   |                                    |                              |                                  | <u>.</u>                      | · · · · · · · · · · · · · · · · · · · |                                       | mental<br>ong<br><sup>Drder Ref.</sup><br>230 | Division<br>erence<br>2415   |  |
| Water Container Codes: F<br>V = VOA Viał HCI Preserved<br>Z = Zinc Acetate Preserved | P = Unpreserved Plastic; N = Nitric Preserve<br>; VB = VOA Vial Sodium Bisulphate Preserve<br>Sottle; E = EDTA Preserved Bottles: ST = Str | ed Plastic; ORC = Nitric Preserved<br>red; VS = VOA Vial Sulfuric Preserved<br>erile Bottle: ASS = Plastic Rag for | ORC; SH = So<br>ved; AV = Airfre<br>Acid Sulphate S | Tor<br>sdlum Hydroxide/Cd Preserved; S = Sodlum<br>ight Unpreserved Vial SG = Sulfuric Presen<br>Solis: B = Unpreserved Ban | Hydroxide Prese<br>ved Amber Glass | rved Plastic;<br>; H = HCl p | AG = Amber G<br>reserved Plasti  | Glass Unprese<br>ic; HS = HCI | rved                                  |                                       |   |                              | ormaldehyde Preserved Glass;   |

ENFM204



# **CERTIFICATE OF ANALYSIS**

| Work Order              | EW2302415                                     | Page                    | : 1 of 7   |
|-------------------------|---|-------------------------|--|
| Client                  | SHELLHARBOUR CITY COUNCIL                     | Laboratory              | Environmental Division NSW South Coast                     |
| Contact                 | : Ryan Stirling                               | Contact                 | : Aneta Prosaroski   |
| Address                 | : LAMERTON HOUSE, LAMERTON CRESCENT           | Address                 | : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia |
|                         | SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529 |                         |  |
| Telephone               | :   | Telephone               | : +61 2 4225 3125  |
| Project                 | : Dunmore Quarterly Surface Water EPL         | Date Samples Received   | : 01-Jun-2023 15:14  |
| Order number            | : 147649                                      | Date Analysis Commenced | : 01-Jun-2023  |
| C-O-C number            | :   | Issue Date              | : 08-Jun-2023 16:58  |
| Sampler                 |   |                         | Hac-MRA NAIA   |
| Site                    | : DUNMORE LANDFILL TENDER                     |                         |  |
| Quote number            | : WO/030/19 TENDER SURFACE WATER              |                         | The Contraction Ale and                                    |
| No. of samples received | : 6   |                         | Accreditation No. 825<br>Accredited for compliance with    |
| No. of samples analysed | : 6   |                         | ISO/IEC 17025 - Testing                                    |

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

#### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| Signatories  | Position                    | Accreditation Category             |
|--------------|-----------------------------|------------------------------------|
| Ankit Joshi  | Senior Chemist - Inorganics | Sydney Inorganics, Smithfield, NSW |
| Dian Dao     | Senior Chemist - Inorganics | Sydney Inorganics, Smithfield, NSW |
| Robert DaLio | Sampler                     | Laboratory - Wollongong, NSW       |



#### **General Comments**

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

 $\emptyset$  = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- Analytical work for this work order will be conducted at ALS Sydney.
- As per QWI EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions Chloride, Alkalinity and Sulfate; and Major Cations Calcium, Magnesium, Potassium and Sodium.
   Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- EG020: LORs have been raised for some samples due to matrix interference (High sample salinity)
- It has been noted that Nitrite is greater than NOx, however this difference is within the limits of experimental variation.
- TDS by method EA-015 may bias high for sample 4 due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.6 Rivers and Streams.
- Temperature performed by ALS Wollongong via in-house method EA116 and EN67 PK.
- Dissolved oxygen (DO) performed by ALS Wollongong via in-house method EP025FD and EN67 PK.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.4 Lakes and Reservoirs
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.



| Sub-Matrix: WATER<br>(Matrix: WATER)         |              |        | Sample ID      | SWP1<br>Point 1   | SWC_2<br>Point 19 | SWC_UP<br>Point 20 | SWC_Down<br>Point 21 | SWC_DOWN_2<br>Point 22 |
|--|--------------|--------|----------------|-------------------|-------------------|--------------------|----------------------|------------------------|
|  |              | Sampli | ng date / time | 01-Jun-2023 09:40 | 01-Jun-2023 11:00 | 01-Jun-2023 10:45  | 01-Jun-2023 11:10    | 01-Jun-2023 11:20      |
| Compound                                     | CAS Number   | LOR    | Unit           | EW2302415-001     | EW2302415-002     | EW2302415-003      | EW2302415-004        | EW2302415-005          |
|  |              |        |                | Result            | Result            | Result             | Result               | Result                 |
| EA005FD: Field pH                            |              |        |                |                   |                   |                    |                      |                        |
| рН   |              | 0.1    | pH Unit        | 7.7               | 7.2               | 7.2                | 7.2                  | 7.3                    |
| EA010FD: Field Conductivity                  |              |        |                |                   |                   |                    |                      |                        |
| Electrical Conductivity (Non<br>Compensated) |              | 1      | μS/cm          | 1080              | 17400             | 18800              | 32600                | 25000                  |
| EA015: Total Dissolved Solids dried at       | 180 ± 5 °C   |        |                |                   |                   |                    |                      |                        |
| Total Dissolved Solids @180°C                |              | 10     | mg/L           |                   | 13600             | 13800              | 26100                | 19200                  |
| EA025: Total Suspended Solids dried          | at 104 ± 2°C |        |                |                   |                   |                    |                      |                        |
| Suspended Solids (SS)                        |              | 5      | mg/L           | <5                | 7                 | 5                  | <5                   | <5                     |
| EA045: Turbidity                             |              |        |                |                   |                   |                    |                      |                        |
| Turbidity                                    |              | 0.1    | NTU            | 1.4               | 8.0               | 7.4                | 4.0                  | 5.1                    |
| EA116: Temperature                           |              |        |                |                   |                   |                    |                      |                        |
| Temperature                                  |              | 0.5    | °C             | 13.4              | 15.0              | 15.4               | 16.9                 | 15.9                   |
| ED037P: Alkalinity by PC Titrator            |              |        |                |                   |                   |                    |                      |                        |
| Hydroxide Alkalinity as CaCO3                | DMO-210-001  | 1      | mg/L           | <1                | <1                | <1                 | <1                   | <1                     |
| Carbonate Alkalinity as CaCO3                | 3812-32-6    | 1      | mg/L           | <1                | <1                | <1                 | <1                   | <1                     |
| Bicarbonate Alkalinity as CaCO3              | 71-52-3      | 1      | mg/L           | 431               | 141               | 139                | 151                  | 144                    |
| Total Alkalinity as CaCO3                    |              | 1      | mg/L           | 431               | 141               | 139                | 151                  | 144                    |
| ED041G: Sulfate (Turbidimetric) as SO        | 4 2- by DA   |        |                |                   |                   |                    |                      |                        |
| Sulfate as SO4 - Turbidimetric               | 14808-79-8   | 1      | mg/L           | 39                | 908               | 968                | 2000                 | 1560                   |
| ED045G: Chloride by Discrete Analyse         | r            |        |                |                   |                   |                    |                      |                        |
| Chloride                                     | 16887-00-6   | 1      | mg/L           | 173               | 6870              | 7090               | 12100                | 9680                   |
| ED093F: Dissolved Major Cations              |              |        |                |                   |                   |                    |                      |                        |
| Calcium                                      | 7440-70-2    | 1      | mg/L           | 73                | 155               | 180                | 288                  | 229                    |
| Magnesium                                    | 7439-95-4    | 1      | mg/L           | 33                | 380               | 465                | 765                  | 592                    |
| Sodium                                       | 7440-23-5    | 1      | mg/L           | 156               | 3280              | 3840               | 6440                 | 5000                   |
| Potassium                                    | 7440-09-7    | 1      | mg/L           | 17                | 122               | 145                | 244                  | 210                    |
| EG020F: Dissolved Metals by ICP-MS           |              |        |                | 2.25              | 0.05              | 0.05               | 0.40                 | 0.40                   |
| Iron   | 7439-89-6    | 0.05   | mg/L           | <0.05             | <0.05             | <0.05              | <0.10                | <0.10                  |
| EG020T: Total Metals by ICP-MS               |              |        |                |                   |                   | 1                  |                      |                        |
| Manganese                                    | 7439-96-5    | 0.001  | mg/L           | 0.116             | 0.074             | 0.074              | 0.052                | 0.055                  |
| Iron   | 7439-89-6    | 0.05   | mg/L           | 0.16              | 0.88              | 0.79               | 0.34                 | 0.53                   |
| EK040P: Fluoride by PC Titrator              |              |        |                |                   |                   |                    | •••                  |                        |
| Fluoride                                     | 16984-48-8   | 0.1    | mg/L           | 0.3               | 0.6               | 0.7                | 0.9                  | 0.8                    |



| Sub-Matrix: WATER<br>(Matrix: WATER)      |                 |        | Sample ID      | SWP1<br>Point 1   | SWC_2<br>Point 19 | SWC_UP<br>Point 20 | SWC_Down<br>Point 21 | SWC_DOWN_2<br>Point 22 |
|---|-----------------|--------|----------------|-------------------|-------------------|--------------------|----------------------|------------------------|
|   |                 | Sampli | ng date / time | 01-Jun-2023 09:40 | 01-Jun-2023 11:00 | 01-Jun-2023 10:45  | 01-Jun-2023 11:10    | 01-Jun-2023 11:20      |
| Compound                                  | CAS Number      | LOR    | Unit           | EW2302415-001     | EW2302415-002     | EW2302415-003      | EW2302415-004        | EW2302415-005          |
|   |                 |        |                | Result            | Result            | Result             | Result               | Result                 |
| EK040P: Fluoride by PC Titrator - Continu | ed              |        |                |                   |                   |                    |                      |                        |
| EK055G: Ammonia as N by Discrete Ana      | lyser           |        |                |                   |                   |                    |                      |                        |
| Ammonia as N                              | 7664-41-7       | 0.01   | mg/L           | 0.96              | 0.29              | 0.20               | 0.69                 | 0.28                   |
| EK055G-NH4: Ammonium as N by DA           |                 |        |                |                   |                   |                    |                      |                        |
| Ammonium as N                             | 14798-03-9_N    | 0.01   | mg/L           | 0.95              | 0.29              | 0.20               | 0.69                 | 0.28                   |
| EK057G: Nitrite as N by Discrete Analys   | er              |        |                |                   |                   |                    |                      |                        |
| Nitrite as N                              | 14797-65-0      | 0.01   | mg/L           | 0.04              | 0.02              | 0.02               | 0.02                 | 0.02                   |
| EK058G: Nitrate as N by Discrete Analys   | ser             |        |                |                   |                   |                    |                      |                        |
| Nitrate as N                              | 14797-55-8      | 0.01   | mg/L           | <0.01             | 0.13              | 0.14               | 0.05                 | 0.08                   |
| EK059G: Nitrite plus Nitrate as N (NOx)   | by Discrete Ana | lyser  |                |                   |                   |                    |                      |                        |
| Nitrite + Nitrate as N                    |                 | 0.01   | mg/L           | 0.03              | 0.15              | 0.16               | 0.07                 | 0.10                   |
| EN055: Ionic Balance                      |                 |        |                |                   |                   |                    |                      |                        |
| Ø Total Anions                            |                 | 0.01   | meq/L          | 14.3              | 216               | 223                | 386                  | 308                    |
| Ø Total Cations                           |                 | 0.01   | meq/L          | 13.6              | 185               | 218                | 364                  | 283                    |
| Ø Ionic Balance                           |                 | 0.01   | %              | 2.60              | 7.67              | 1.12               | 2.97                 | 4.30                   |
| EP005: Total Organic Carbon (TOC)         |                 |        |                |                   |                   |                    |                      |                        |
| Total Organic Carbon                      |                 | 1      | mg/L           | 25                | 10                | 9                  | 7                    | 8                      |
| EP025FD: Field Dissolved Oxygen           |                 |        |                |                   |                   |                    |                      |                        |
| Dissolved Oxygen                          |                 | 0.01   | mg/L           | 5.90              | 6.32              | 6.71               | 6.05                 | 6.55                   |



| Sub-Matrix: WATER<br>(Matrix: WATER)         |             |        | Sample ID      | Duplicate         | <br> | <br> |
|--|-------------|--------|----------------|-------------------|------|------|
|  |             | Sampli | ng date / time | 01-Jun-2023 11:00 | <br> | <br> |
| Compound                                     | CAS Number  | LOR    | Unit           | EW2302415-006     | <br> | <br> |
|  |             |        |                | Result            | <br> | <br> |
| EA005FD: Field pH                            |             |        |                |                   |      |      |
| рН   |             | 0.1    | pH Unit        | 7.2               | <br> | <br> |
| EA010FD: Field Conductivity                  |             |        |                |                   |      |      |
| Electrical Conductivity (Non<br>Compensated) |             | 1      | μS/cm          | 17400             | <br> | <br> |
| EA015: Total Dissolved Solids dried at 1     | 80 ± 5 °C   |        |                |                   |      |      |
| Total Dissolved Solids @180°C                |             | 10     | mg/L           | 13100             | <br> | <br> |
| EA025: Total Suspended Solids dried at       | 104 ± 2°C   |        |                |                   |      |      |
| Suspended Solids (SS)                        |             | 5      | mg/L           | <5                | <br> | <br> |
| EA045: Turbidity                             |             |        |                |                   |      |      |
| Turbidity                                    |             | 0.1    | NTU            | 8.0               | <br> | <br> |
| EA116: Temperature                           |             |        |                |                   |      |      |
| Temperature                                  |             | 0.5    | °C             | 15.0              | <br> | <br> |
| ED037P: Alkalinity by PC Titrator            |             |        |                |                   |      |      |
| Hydroxide Alkalinity as CaCO3                | DMO-210-001 | 1      | mg/L           | <1                | <br> | <br> |
| Carbonate Alkalinity as CaCO3                | 3812-32-6   | 1      | mg/L           | <1                | <br> | <br> |
| Bicarbonate Alkalinity as CaCO3              | 71-52-3     | 1      | mg/L           | 141               | <br> | <br> |
| Total Alkalinity as CaCO3                    |             | 1      | mg/L           | 141               | <br> | <br> |
| ED041G: Sulfate (Turbidimetric) as SO4       | 2- by DA    |        |                |                   |      |      |
| Sulfate as SO4 - Turbidimetric               | 14808-79-8  | 1      | mg/L           | 915               | <br> | <br> |
| ED045G: Chloride by Discrete Analyser        |             |        |                |                   |      |      |
| Chloride                                     | 16887-00-6  | 1      | mg/L           | 6790              | <br> | <br> |
| ED093F: Dissolved Major Cations              |             |        |                |                   |      |      |
| Calcium                                      | 7440-70-2   | 1      | mg/L           | 172               | <br> | <br> |
| Magnesium                                    | 7439-95-4   | 1      | mg/L           | 435               | <br> | <br> |
| Sodium                                       | 7440-23-5   | 1      | mg/L           | 3650              | <br> | <br> |
| Potassium                                    | 7440-09-7   | 1      | mg/L           | 140               | <br> | <br> |
| EG020F: Dissolved Metals by ICP-MS           |             |        |                |                   |      |      |
| Iron   | 7439-89-6   | 0.05   | mg/L           | <0.05             | <br> | <br> |
| EG020T: Total Metals by ICP-MS               |             |        |                |                   |      |      |
| Manganese                                    | 7439-96-5   | 0.001  | mg/L           | 0.077             | <br> | <br> |
| Iron   | 7439-89-6   | 0.05   | mg/L           | 0.93              | <br> | <br> |
| EK040P: Fluoride by PC Titrator              |             |        |                |                   |      |      |
| Fluoride                                     | 16984-48-8  | 0.1    | mg/L           | 0.6               | <br> | <br> |



| Sub-Matrix: WATER<br>(Matrix: WATER)     |                 |        | Sample ID      | Duplicate         | <br> | <br> |
|--|-----------------|--------|----------------|-------------------|------|------|
|  |                 | Sampli | ng date / time | 01-Jun-2023 11:00 | <br> | <br> |
| Compound                                 | CAS Number      | LOR    | Unit           | EW2302415-006     | <br> | <br> |
|  |                 |        |                | Result            | <br> | <br> |
| EK055G: Ammonia as N by Discrete Anal    | yser            |        |                |                   |      |      |
| Ammonia as N                             | 7664-41-7       | 0.01   | mg/L           | 0.32              | <br> | <br> |
| EK055G-NH4: Ammonium as N by DA          |                 |        |                |                   |      |      |
| Ammonium as N                            | 14798-03-9_N    | 0.01   | mg/L           | 0.32              | <br> | <br> |
| EK057G: Nitrite as N by Discrete Analyse | ə <b>r</b>      |        |                |                   |      |      |
| Nitrite as N                             | 14797-65-0      | 0.01   | mg/L           | 0.03              | <br> | <br> |
| EK058G: Nitrate as N by Discrete Analys  | er              |        |                |                   |      |      |
| Nitrate as N                             | 14797-55-8      | 0.01   | mg/L           | 0.11              | <br> | <br> |
| EK059G: Nitrite plus Nitrate as N (NOx)  | by Discrete Ana | lyser  |                |                   |      |      |
| Nitrite + Nitrate as N                   |                 | 0.01   | mg/L           | 0.14              | <br> | <br> |
| EN055: Ionic Balance                     |                 |        |                |                   |      |      |
| Ø Total Anions                           |                 | 0.01   | meq/L          | 213               | <br> | <br> |
| Ø Total Cations                          |                 | 0.01   | meq/L          | 207               | <br> | <br> |
| ø lonic Balance                          |                 | 0.01   | %              | 1.59              | <br> | <br> |
| EP005: Total Organic Carbon (TOC)        |                 |        |                |                   |      |      |
| Total Organic Carbon                     |                 | 1      | mg/L           | 8                 | <br> | <br> |
| EP025FD: Field Dissolved Oxygen          |                 |        |                |                   |      |      |
| Dissolved Oxygen                         |                 | 0.01   | mg/L           | 6.32              | <br> | <br> |



### Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) EA045: Turbidity (WATER) EP005: Total Organic Carbon (TOC) (WATER) EG020F: Dissolved Metals by ICP-MS (WATER) EG020T: Total Metals by ICP-MS (WATER) EK057G: Nitrite as N by Discrete Analyser (WATER) EK058G: Nitrate as N by Discrete Analyser (WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (WATER) EA025: Total Suspended Solids dried at 104 ± 2°C (WATER) EK055G-NH4: Ammonium as N by DA (WATER) EK055G: Ammonia as N by Discrete Analyser (WATER) EN055: Ionic Balance (WATER) ED045G: Chloride by Discrete Analyser (WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (WATER) EK040P: Fluoride by PC Titrator (WATER) ED037P: Alkalinity by PC Titrator (WATER) ED093F: Dissolved Major Cations (WATER) EA015: Total Dissolved Solids dried at 180 ± 5 °C



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| CLIENT:                  | Shellharbour City Council                    |                                    | TURNAR                         | DUND REQUIREMENTS : Standard TAT (Lis                             | t due date)   | :                             |               |   | FOR LABOR  | ATORY USE                             | ONLY (Circle)  |
|--------------------------|--|------------------------------------|--------------------------------|---|---------------|-------------------------------|---------------|---|--|---------------------------------------|--|
| OFFICE:                  | 41 Burelli St WOLLONGONG NSW                 | 2500                               | (Standard TA<br>e.g., Ultra Tr | AT may be longer for some tests  ace Organics)  Non Standard or u | rgent TAT (   | List due date)                | ):            |   | Custody Seel M   | tact?                                 | Cres No NA   |
| PROJECT:                 | Testing                                      | SWP01 Overflow full                | ALS QUO                        | TE NO.: WO/030/19 TENDER  |               |                               | COC SEQU      | ENCE NUMBER (                                 | Circle) Free ice Afrozen<br>receipt?   | i ice bricks presi                    | nt upon Yes No N/A   |
| ORDER NUMBER:            |  |                                    |                                |   |               | COC:                          | 1 2           | 3 4 5   | 6 7 Random Sample  | e Temperature d                       | n Receipt. 🥌 to  |
| PROJECT MANAGER:         | Joel Culton                                  |                                    |                                |   |               | OF:                           | 1 2           | 3 4 5   | 6 7 Other comment  |                                       | 52   |
| SAMPLER: Michae          | el Santas                                    | SAMPLER N                          | IOBILE: C                      | 403530 891 RELINQUISHED BY:                                       |               | REC                           | EIVED BY:     |   | RELINQUISHED BY  | Y:                                    | RECEIVED BY:   |
| COC emailed to ALS?      | (YES / NO)                                   | EDD FORM                           | AT (or defau                   | 10: Michael San   | hon .         | 4                             | net           | G   |  |                                       |  |
| Email Reports to :       |  |                                    | -                              | DATE/TIMÉ:  | -             | DATE                          |               |   | DATE/TIME:   |                                       | DATE/TIME:   |
| Email Invoice to :       |  |                                    |                                | pi-05-23  |               | <u>36</u>                     | 1/5,          | 123   |  | _                                     |  |
| COMMENTS/SPECIAL         | HANDLING/STORAGE OR DISPOSA                  | L: CC reports to                   | :                              |   |               |                               |               |   |  |                                       | ÷ .  |
| ALS USE ONLY             | SAMPLE<br>MATRIX: So                         | E DETAILS<br>lid(S) Water(W)       |                                | CONTAINER INFORMATION   | ANALY         | YSIS REQUIR                   | RED includir  | g SUITES (NB. Si<br>al (unfiltered bottle req | uite Codes must be listed to attra<br>uired) or Dissolved (field filtered bott | act suite price)<br>tle required).    | Additional Information   |
|                          | SAMDLE ID                                    |                                    | MATDIX                         | TYPE & PRESERVATIVE TOTAL   |               |                               | 43, Total Mn  | d Total Fe                                    |  |                                       | Comments on likely contaminant levels,<br>dilutions, or samples requiring specific QC<br>analysis etc. |
|                          | SAMPLEID                                     | DATE / TIME                        | MAIRIX                         | (refer to codes below) BOTTLES                                    | TSS           | NT-1, NT-2A<br>(Ionic Balance | TOC, NT-4, N  | Dissolved and                                 |  | -                                     |  |
|                          | SWP1   | 1.5-23 12:47                       | w                              |   | 1             | 1                             | *             | 1   |  |                                       | Field Tests - pH, EC, DO & Temp  |
| :                        |  |                                    |                                |   |               |                               |               |   |  |                                       |  |
|                          |  |                                    |                                |   |               |                               |               |   |  |                                       |  |
|                          |  |                                    |                                |   |               | ~                             |               |   | Environme<br>Wollongor<br>Work Ord<br>EW#                                      | ental Div<br>ng<br>der Refere<br>2301 | nce<br>940   |
|                          |  |                                    |                                |   |               |                               |               |   |  |                                       |  |
|                          |  |                                    |                                | · · ·   |               |                               |               |   |  |                                       |  |
|                          |  |                                    |                                |   |               |                               |               |   |  | 2253125                               |  |
| Water Container Codes: 1 | P = Unpreserved Plastic; N = Nitric Preserve | ad Plastic; CRC = Nitric Preserved | 1 ORC; SH = 1                  | 10<br>Sodium Hydroxide/Cd Preserved, S = Sodium Hydroxide Pres    | erved Plastic | ; AG = Amber G                | Blass Unprese | ved; AP - Airfreight                          | Unpreserved Plastic  |                                       |  |

V = VOA Vial HCI Preserved VB = VOA Vial Solum Bisulphate Preserved; VS = VOA Vial Solum Bisulphate Preserved; VS = VOA Vial Solum Creserved; VS = VOA Vial Solution Creserved;



# **CERTIFICATE OF ANALYSIS**

| Work Order              | EW2301940                                     | Page                    | : 1 of 5   |
|-------------------------|---|-------------------------|--|
| Client                  | SHELLHARBOUR CITY COUNCIL                     | Laboratory              | Environmental Division NSW South Coast                     |
| Contact                 | : Ryan Stirling                               | Contact                 | : Aneta Prosaroski   |
| Address                 | : LAMERTON HOUSE, LAMERTON CRESCENT           | Address                 | : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia |
|                         | SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529 |                         |  |
| Telephone               | ·   | Telephone               | : +61 2 4225 3125  |
| Project                 | : Dunmore Surface Water SWP01 Overflow        | Date Samples Received   | : 01-May-2023 13:38  |
| Order number            | : 147649                                      | Date Analysis Commenced | : 01-May-2023  |
| C-O-C number            | :   | Issue Date              | 08-May-2023 10:48  |
| Sampler                 | : Michael Santos                              |                         | HALA NALA  |
| Site                    | : DUNMORE LANDFILL TENDER                     |                         |  |
| Quote number            | : WO/030/19 TENDER SURFACE WATER              |                         | The Contraction of the second                              |
| No. of samples received | : 1   |                         | Accreditation No. 825<br>Accredited for compliance with    |
| No. of samples analysed | : 1   |                         | ISO/IEC 17025 - Testing                                    |

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

#### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| Signatories      | Position                              | Accreditation Category             |
|------------------|---------------------------------------|------------------------------------|
| Aneta Prosaroski | Environmental Services Representative | Laboratory - Wollongong, NSW       |
| Ankit Joshi      | Senior Chemist - Inorganics           | Sydney Inorganics, Smithfield, NSW |



#### **General Comments**

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- Analytical work for this work order will be conducted at ALS Sydney.
- As per QWI EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions Chloride, Alkalinity and Sulfate; and Major Cations Calcium, Magnesium, Potassium and Sodium.
   Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- Sample site SWP1 was not discharging at time of sampling.
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Temperature performed by ALS Wollongong via in-house method EA116 and EN67 PK.
- Dissolved oxygen (DO) performed by ALS Wollongong via in-house method EP025FD and EN67 PK.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.4 Lakes and Reservoirs
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.</li>



| Sub-Matrix: WATER<br>(Matrix: WATER)         | Sample ID   |        |                | SWP1<br>Point 1   | <br> | <br> |
|--|-------------|--------|----------------|-------------------|------|------|
|  |             | Sampli | ng date / time | 01-May-2023 12:47 | <br> | <br> |
| Compound                                     | CAS Number  | LOR    | Unit           | EW2301940-001     | <br> | <br> |
|  |             |        |                | Result            | <br> | <br> |
| EA005FD: Field pH                            |             |        |                |                   |      |      |
| рН   |             | 0.1    | pH Unit        | 7.6               | <br> | <br> |
| EA010FD: Field Conductivity                  |             |        |                |                   |      |      |
| Electrical Conductivity (Non<br>Compensated) |             | 1      | μS/cm          | 1240              | <br> | <br> |
| EA015: Total Dissolved Solids dried at       | 180 ± 5 °C  |        |                |                   |      |      |
| Total Dissolved Solids @180°C                |             | 10     | mg/L           | 654               | <br> | <br> |
| EA025: Total Suspended Solids dried a        | t 104 ± 2°C |        |                |                   |      |      |
| Suspended Solids (SS)                        |             | 5      | mg/L           | 9                 | <br> | <br> |
| EA045: Turbidity                             |             |        |                |                   |      |      |
| Turbidity                                    |             | 0.1    | NTU            | 4.5               | <br> | <br> |
| EA116: Temperature                           |             |        |                |                   |      |      |
| Temperature                                  |             | 0.1    | °C             | 19.5              | <br> | <br> |
| ED037P: Alkalinity by PC Titrator            |             |        |                |                   |      |      |
| Hydroxide Alkalinity as CaCO3                | DMO-210-001 | 1      | mg/L           | <1                | <br> | <br> |
| Carbonate Alkalinity as CaCO3                | 3812-32-6   | 1      | mg/L           | <1                | <br> | <br> |
| Bicarbonate Alkalinity as CaCO3              | 71-52-3     | 1      | mg/L           | 354               | <br> | <br> |
| Total Alkalinity as CaCO3                    |             | 1      | mg/L           | 354               | <br> | <br> |
| ED041G: Sulfate (Turbidimetric) as SO4       | 2- by DA    |        |                |                   |      |      |
| Sulfate as SO4 - Turbidimetric               | 14808-79-8  | 1      | mg/L           | 43                | <br> | <br> |
| ED045G: Chloride by Discrete Analyser        |             |        |                |                   |      |      |
| Chloride                                     | 16887-00-6  | 1      | mg/L           | 168               | <br> | <br> |
| ED093F: Dissolved Major Cations              |             |        |                |                   |      |      |
| Calcium                                      | 7440-70-2   | 1      | mg/L           | 59                | <br> | <br> |
| Magnesium                                    | 7439-95-4   | 1      | mg/L           | 27                | <br> | <br> |
| Sodium                                       | 7440-23-5   | 1      | mg/L           | 135               | <br> | <br> |
| Potassium                                    | 7440-09-7   | 1      | mg/L           | 14                | <br> | <br> |
| EG020F: Dissolved Metals by ICP-MS           |             |        |                |                   |      |      |
| Iron   | 7439-89-6   | 0.05   | mg/L           | 0.06              | <br> | <br> |
| EG020T: Total Metals by ICP-MS               |             |        |                |                   |      |      |
| Manganese                                    | 7439-96-5   | 0.001  | mg/L           | 0.184             | <br> | <br> |
| Iron   | 7439-89-6   | 0.05   | mg/L           | 0.32              | <br> | <br> |
| EK040P: Fluoride by PC Titrator              |             |        |                |                   |      |      |
| Fluoride                                     | 16984-48-8  | 0.1    | mg/L           | 0.3               | <br> | <br> |



| Sub-Matrix: WATER<br>(Matrix: WATER)      |                 |         | Sample ID      | SWP1<br>Point 1   | <br> | <br> |
|---|-----------------|---------|----------------|-------------------|------|------|
|   |                 | Samplii | ng date / time | 01-May-2023 12:47 | <br> | <br> |
| Compound                                  | CAS Number      | LOR     | Unit           | EW2301940-001     | <br> | <br> |
|   |                 |         |                | Result            | <br> | <br> |
| EK055G: Ammonia as N by Discrete Analy    | yser            |         |                |                   |      |      |
| Ammonia as N                              | 7664-41-7       | 0.01    | mg/L           | 0.04              | <br> | <br> |
| EK055G-NH4: Ammonium as N by DA           |                 |         |                |                   |      |      |
| Ammonium as N                             | 14798-03-9_N    | 0.01    | mg/L           | 0.04              | <br> | <br> |
| EK057G: Nitrite as N by Discrete Analyse  | ə <b>r</b>      |         |                |                   |      |      |
| Nitrite as N                              | 14797-65-0      | 0.01    | mg/L           | <0.01             | <br> | <br> |
| EK058G: Nitrate as N by Discrete Analyse  | er              |         |                |                   |      |      |
| Nitrate as N                              | 14797-55-8      | 0.01    | mg/L           | <0.01             | <br> | <br> |
| EK059G: Nitrite plus Nitrate as N (NOx) b | oy Discrete Ana | lyser   |                |                   |      |      |
| Nitrite + Nitrate as N                    |                 | 0.01    | mg/L           | <0.01             | <br> | <br> |
| EN055: Ionic Balance                      |                 |         |                |                   |      |      |
| Ø Total Anions                            |                 | 0.01    | meq/L          | 12.7              | <br> | <br> |
| Ø Total Cations                           |                 | 0.01    | meq/L          | 11.4              | <br> | <br> |
| Ø Ionic Balance                           |                 | 0.01    | %              | 5.44              | <br> | <br> |
| EP005: Total Organic Carbon (TOC)         |                 |         |                |                   |      |      |
| Total Organic Carbon                      |                 | 1       | mg/L           | 281               | <br> | <br> |
| EP025FD: Field Dissolved Oxygen           |                 |         |                |                   |      |      |
| Dissolved Oxygen                          |                 | 0.01    | mg/L           | 6.77              | <br> | <br> |


#### Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) EA045: Turbidity (WATER) EP005: Total Organic Carbon (TOC) (WATER) EG020F: Dissolved Metals by ICP-MS (WATER) EG020T: Total Metals by ICP-MS (WATER) EK057G: Nitrite as N by Discrete Analyser (WATER) EK058G: Nitrate as N by Discrete Analyser (WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (WATER) EA025: Total Suspended Solids dried at 104 ± 2°C (WATER) EK055G-NH4: Ammonium as N by DA (WATER) EK055G: Ammonia as N by Discrete Analyser (WATER) EN055: Ionic Balance (WATER) ED045G: Chloride by Discrete Analyser (WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (WATER) EK040P: Fluoride by PC Titrator (WATER) ED037P: Alkalinity by PC Titrator (WATER) ED093F: Dissolved Major Cations (WATER) EA015: Total Dissolved Solids dried at 180 ± 5 °C

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|---------------|---------------------------------------|------------------------------|------------------------------|---|-----------------------------------|--------------|---|---------------|----------------|-----------------|-------------------------------------|-------------------|---------------|---|
| ENT:          | Shellharbour City Council             |                              | TURNAR                       | OUND REQUIREMENTS :   | Standard TAT (Lis                 | t due date   | ):                                      |               |                |                 | FOR                                 | LABORAT           | ORYUSE        | NLY (Circle)  |
|               | 41 Burelli St WOLLONGONG NSW          | 2500                         | (Standard T<br>e.g., Ultra T | (Standard TAT may be longer for some tests<br>e.g., Ultra Trace Organics) Non Standard or urgent TAT (List due date): |                                   |              |   |               |                |                 | Cusp                                | ody Seal Inte     | *2            |   |
|               | Dunmore Quarterly Leachate            | ······                       | ALS QUO                      | DTE NO.: WO   | /030/19 TENDER                    |              |   | COC SEQU      | ENCE NUM       | BER (Circle     | ) Free                              | lce / ficzen ic   | a bricka pres | entropon 🖌 No   |
| ER NUMBER:    |                                       | ······                       |                              | · · · · · · · · · · · · · · · · · · ·   |                                   |              | coc:                                    | 1 2           | 34             | 56              | 7 Rand                              | on<br>om Semple T | enperature :  | n Revent 🖵 🖌 🖓  |
| JECT MANAGER: | Ryan Stirling                         | ~ ~ ~                        |                              | · · · · · · · · · · · · · · · · · · ·   |                                   |              | OF:                                     | 1 2           | 34             | 56              | 7 Othe                              | omment            |               | 4.5   |
|               | DALDIM                                | . San LeSAMPLER              | R MOBILE:                    |   | RELINQUISHED BY:                  |              | RECI                                    | IVED BY:      | /              |                 | RELINQUI                            | SHED BY:          |               | RECEIVED BY:  |
| Reports to :  | (TES / NU)                            | EDD FOR                      | MAT (or defau                | ult):   | - 1 - I Jack                      | - 1.2.       |   | It            | ret            | 9               |                                     |                   |               |   |
| Invoice to    |                                       |                              |                              |   |                                   |              | DATE                                    | ZTIME:        | 1 .            | <b>~</b> ~      | DATE/TIM                            | E: ·              |               | DATE/TIME:  |
|               |                                       |                              |                              |   | 1.6.23                            |              | _                                       |               | 6.             | <u> </u>        |                                     |                   |               |   |
| MENTS/SPECIAL | HANDLING/STORAGE OR DISPOSA           | L: CC reports t              | 0:                           |   |                                   |              |   |               |                |                 |                                     |                   |               |   |
| LS USE ONLY   | SAMPLI<br>MATRIX: So                  | E DETAILS<br>lid(S) Water(W) |                              | CONTAINER IN  | IFORMATION                        | ANALY<br>Whe | SIS REQUIRI                             | ED includin   | g SUITES       | (NB. Suite Coo  | les must be lis<br>Dissolved (field | sted to attract   | Suite price)  | Additional Information  |
|               |                                       |                              |                              | · · · · · · · · · · · · · · · · · · ·   |                                   |              | " ¥                                     |               | ų              | ,               |                                     |                   |               | Comments on likely contaminant levels, dilu<br>or samples requiring specific QC analysis et |
| LAB ID        | SAMPLE ID                             | DATE / TIME                  | MATRIX                       | TYPE & PRESERVA<br>(refer to codes bel  | ATIVE TOTAL<br>ow) BOTTLES        | mmonia       | IT-2A (Alk<br>b4, Cl, Fl)<br>Itered Ca, | 2             | otal Fe & M    | 14 (NO2,<br>03) |                                     | s                 |               |   |
|               | Leachate Storage Tank - LP1           | 1.6.23 12:4                  | ŵ.                           | - <u>,</u>  |                                   | ₹            | Z ĭő iĽ<br>✓                            |               | ▲ Te           | E¥<br>✓         |                                     | 4                 |               | Field Tests - DH EC Tomp & r  |
|               |                                       |                              |                              |   |                                   |              |   |               |                |                 |                                     |                   |               |   |
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|               |                                       |                              | ┼──┼-                        |   |                                   |              |   |               |                | <u> </u>        |                                     |                   |               |   |
|               |                                       |                              |                              |   |                                   |              |   |               | i              |                 |                                     |                   |               |   |
|               |                                       |                              |                              |   |                                   | <u>.</u>     |   |               |                |                 |                                     |                   |               |   |
|               |                                       |                              |                              |   | 10                                |              |   |               |                |                 |                                     |                   |               |   |



# **CERTIFICATE OF ANALYSIS**

| Work Order              | : EW2302414                                   | Page                    | : 1 of 4   |
|-------------------------|---|-------------------------|--|
| Client                  | SHELLHARBOUR CITY COUNCIL                     | Laboratory              | Environmental Division NSW South Coast                     |
| Contact                 | : Ryan Stirling                               | Contact                 | : Aneta Prosaroski   |
| Address                 | : LAMERTON HOUSE, LAMERTON CRESCENT           | Address                 | : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia |
|                         | SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529 |                         |  |
| Telephone               | :   | Telephone               | : +61 2 4225 3125  |
| Project                 | : Dunmore Quarterly Leachate Tank EPL         | Date Samples Received   | : 01-Jun-2023 15:16  |
| Order number            | : 147649                                      | Date Analysis Commenced | : 01-Jun-2023  |
| C-O-C number            | :   | Issue Date              | : 07-Jun-2023 18:50  |
| Sampler                 | : Michael Santos, Robert DaLio                |                         | Hac-MRA NATA   |
| Site                    | : DUNMORE LANDFILL TENDER                     |                         |  |
| Quote number            | : WO/030/19 TENDER LEACHATE                   |                         | The Contraction of the second                              |
| No. of samples received | : 1   |                         | Accreditation No. 825                                      |
| No. of samples analysed | : 1   |                         | ISO/IEC 17025 - Testing                                    |

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

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- Analytical Results

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#### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| Signatories      | Position                              | Accreditation Category             |
|------------------|---------------------------------------|------------------------------------|
| Aneta Prosaroski | Environmental Services Representative | Laboratory - Wollongong, NSW       |
| Ankit Joshi      | Senior Chemist - Inorganics           | Sydney Inorganics, Smithfield, NSW |



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The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- Analytical work for this work order will be conducted at ALS Sydney.
- ED041G: LOR raised for Sulfate due to sample matrix
- EK057/EK059G:Nitrite and NOx results confirmed by re analysis.
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Temperature performed by ALS Wollongong via in-house method EA116 and EN67 PK.
- Dissolved oxygen (DO) performed by ALS Wollongong via in-house method EP025FD and EN67 PK.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.10 Wastewaters
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.</li>



| Sub-Matrix: WATER<br>(Matrix: WATER)         |             |        | Sample ID      | Leachate Storage<br>Tank<br>LP1 | <br> | <br> |
|--|-------------|--------|----------------|---------------------------------|------|------|
|  |             | Sampli | ng date / time | 01-Jun-2023 12:40               | <br> | <br> |
| Compound                                     | CAS Number  | LOR    | Unit           | EW2302414-001                   | <br> | <br> |
|  |             |        |                | Result                          | <br> | <br> |
| EA005FD: Field pH                            |             |        |                |                                 |      |      |
| рН   |             | 0.1    | pH Unit        | 9.3                             | <br> | <br> |
| EA010FD: Field Conductivity                  |             |        |                |                                 |      |      |
| Electrical Conductivity (Non<br>Compensated) |             | 1      | μS/cm          | 7380                            | <br> | <br> |
| EA015: Total Dissolved Solids dried at 18    | 80 ± 5 °C   |        |                |                                 |      |      |
| Total Dissolved Solids @180°C                |             | 10     | mg/L           | 5290                            | <br> | <br> |
| EA116: Temperature                           |             |        |                |                                 |      |      |
| Temperature                                  |             | 0.1    | °C             | 13.8                            | <br> | <br> |
| ED037P: Alkalinity by PC Titrator            |             |        |                |                                 |      |      |
| Hydroxide Alkalinity as CaCO3                | DMO-210-001 | 1      | mg/L           | <1                              | <br> | <br> |
| Carbonate Alkalinity as CaCO3                | 3812-32-6   | 1      | mg/L           | 946                             | <br> | <br> |
| Bicarbonate Alkalinity as CaCO3              | 71-52-3     | 1      | mg/L           | 1840                            | <br> | <br> |
| Total Alkalinity as CaCO3                    |             | 1      | mg/L           | 2780                            | <br> | <br> |
| ED041G: Sulfate (Turbidimetric) as SO4 2     | 2- by DA    |        |                |                                 |      |      |
| Sulfate as SO4 - Turbidimetric               | 14808-79-8  | 1      | mg/L           | <50                             | <br> | <br> |
| ED045G: Chloride by Discrete Analyser        |             |        |                |                                 |      |      |
| Chloride                                     | 16887-00-6  | 1      | mg/L           | 1810                            | <br> | <br> |
| ED093F: Dissolved Major Cations              |             |        |                |                                 |      |      |
| Calcium                                      | 7440-70-2   | 1      | mg/L           | 39                              | <br> | <br> |
| Potassium                                    | 7440-09-7   | 1      | mg/L           | 375                             | <br> | <br> |
| EG020T: Total Metals by ICP-MS               |             |        |                |                                 |      |      |
| Manganese                                    | 7439-96-5   | 0.001  | mg/L           | 0.096                           | <br> | <br> |
| Iron   | 7439-89-6   | 0.05   | mg/L           | 1.29                            | <br> | <br> |
| EK040P: Fluoride by PC Titrator              |             |        |                |                                 |      |      |
| Fluoride                                     | 16984-48-8  | 0.1    | mg/L           | 0.3                             | <br> | <br> |
| EK055G: Ammonia as N by Discrete Ana         | lyser       |        |                |                                 |      |      |
| Ammonia as N                                 | 7664-41-7   | 0.01   | mg/L           | 344                             | <br> | <br> |
| EK057G: Nitrite as N by Discrete Analys      | er          |        |                |                                 |      |      |
| Nitrite as N                                 | 14797-65-0  | 0.01   | mg/L           | 6.96                            | <br> | <br> |
| EK058G: Nitrate as N by Discrete Analys      | ser         |        |                |                                 |      |      |
| Nitrate as N                                 | 14797-55-8  | 0.01   | mg/L           | <0.10                           | <br> | <br> |



| Sub-Matrix: WATER<br>(Matrix: WATER)      |                | Sampli | Sample ID    | Leachate Storage<br>Tank<br>LP1 | <br> | <br> |
|---|----------------|--------|--------------|---------------------------------|------|------|
|   |                | Campin |              |                                 | <br> |      |
| Compound                                  | CAS Number     | LOR    | Unit         | EW2302414-001                   | <br> | <br> |
|   |                |        |              | Result                          | <br> | <br> |
| EK059G: Nitrite plus Nitrate as N (NOx) b | y Discrete Ana | lyser  |              |                                 |      |      |
| Nitrite + Nitrate as N                    |                | 0.01   | mg/L         | 1.25                            | <br> | <br> |
| EP005: Total Organic Carbon (TOC)         |                |        |              |                                 |      |      |
| Total Organic Carbon                      |                | 1      | mg/L         | 407                             | <br> | <br> |
| EP025FD: Field Dissolved Oxygen           |                |        |              |                                 |      |      |
| Dissolved Oxygen                          |                | 0.01   | mg/L         | 6.22                            | <br> | <br> |
| Dissolved Oxygen - % Saturation           |                | 0.1    | % saturation | 60.0                            | <br> | <br> |

#### Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) ED093F: Dissolved Major Cations

(WATER) EP005: Total Organic Carbon (TOC)

(WATER) EK055G: Ammonia as N by Discrete Analyser

(WATER) EG020T: Total Metals by ICP-MS

(WATER) EK057G: Nitrite as N by Discrete Analyser

(WATER) EK058G: Nitrate as N by Discrete Analyser

(WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser

(WATER) EA015: Total Dissolved Solids dried at 180 ± 5 °C

(WATER) ED045G: Chloride by Discrete Analyser

(WATER) ED037P: Alkalinity by PC Titrator

(WATER) EK040P: Fluoride by PC Titrator

(WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA



Appendix E: Laboratory Chain of Custody (COC) & Certificates of Analysis (COA) – Water Samples – Quarter 4 

 CHAIN OF CUSTODY
 Image: Syddin Phil 02 B

 ALS Laboratory: please tick ->
 Image: New of the Phil 02 B

 El Sydney, 277 Wootpark Rd, Smithlish NSW 2178
 Di Briabane, 32 Shånd St, Stafford QLD 4053
 Ph.02 4784 A555 Examples sydney@aldenvind com
 El Newcastlic's Rosegum Rd, Wargporcek NSW 2304
 Commaville: 14-15 Desma CL, Bohle QLD 4919
 Ph.02 4468 (2433 Examples newcastlingBalenvino.com
 Ph.02 4468 (2433 Examples newcastlingBalenvino.com

Molbourne: 2-4 Westall Rd. Spring vale VIC 3171
Ph:03 8513 9600 E. samples melbournergausenviro.com
 Adelaide: 2-4 Burns Rd, Pocraka SA 5095
Ph:08 8550 0690 Sacretaergateerwirb com

Perth 10 Hod Way, Malaga WA 6000
 Ph: 08 9209 7655 E: samples: parth@alsenvice.com
 Cl. Launceston: 27 Wellington St. Launceston: TAS 7250
 Ph: 03 6331 2156 E: launceston@alsenvice.com

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122

|                                       | Shellharbour City Council               |                 |                        | TURNAS     |  | CI Steed-             |                 |                |                   |                   |                    |                    |                      |  |  |
|---------------------------------------|---|-----------------|------------------------|------------|--|-----------------------|-----------------|----------------|-------------------|-------------------|--------------------|--------------------|----------------------|--|--|
| OFFICE:                               | 41 Burelli St WOLLONGONG N              | ISW 2500        |                        | (Standard  | TAT may be longer for some tests           | Standard     Non Star | i IAI (List     | due date):     | iet due data      | ۰.                |                    |                    | FORI                 | ABORATORY USE (                            |  |
| PROJECT:                              | Dunmore Quarterly Ground W              | aters EPL       |                        | ALS QU     | Trace Organics)<br>OTE NO.: WO/03          | 0/19 TENDER           |                 |                | ist due date      | COC SEQ           |                    | 3ER (Circle        | Freefo               | y Seel naad.<br>9/ frozen ice bricke prese | nt upon  |
| ORDER NUMBER:                         |   |                 | •                      | -          |  |                       |                 |                | coc               | 1 2               | 3 4                | 5 6                | 7 Randor             | n Sample Temperature o                     | n Receipt                                      |
| PROJECT MANAGER:                      | Ryan Stirling                           |                 |                        |            |  |                       |                 |                | OF:               | 1 2               | 34                 | 56                 | 7 Other c            | omment.                                    | 56   |
| SAMPLER: Pol                          | sert Oak                                | -10             | SAMPLER M              | OBILE:     |  |                       | ED BY:          | $\sim$         | REC               | EIVED BY:         |                    |                    | RELINQUIS            | HED BY:                                    | RECEIVED BY:                                   |
| COC emailed to ALS?                   | ( YES / NO)                             |                 | EDD FORMA              | T (or defa | ult):                                      | KODEr                 | 1               | Jer            | · · · · +         | thet              | 9                  | :                  |                      | • a .                                      |  |
| Email Invoice to :                    |   |                 |                        |            | · · · · · · · · · · · · · · · · · · ·      |                       | 122             |                | DAT               | E/TIME:           | 27                 |                    | DATE/TIME:           |  | DATE/TIME:                                     |
|                                       |   | OSAL ·          | CC reports to:         |            | ·  | <u>'/ '</u>           |                 |                |                   | 1/4               | 63                 |                    |                      |  |  |
|                                       |   |                 | oc reports to.         |            | ······                                     |                       |                 |                |                   | ·                 |                    |                    |                      |  | 7  |
| ALS USE ONLY                          | SAN<br>MATRIX                           | MPLE DETAI      | ILS<br>ater(W)         |            | CONTAINER INFO                             | ORMATION              |                 | ANALY          | SIS REQUIR        | ED includi        | ng SUITES          | NB. Suite Co       | dəs must bə liste    | ed to attract suite price)                 | Additional Information                         |
|                                       |   |                 | . ,                    |            |  |                       |                 | Whei           | re Metals are req | luired, specify T | otal (unfiltered b | ottle required) o  | Dissolved (field fil | lered bottle required).                    | Commoste en likely anteninget la start d'atte  |
|                                       |   |                 |                        |            | •  |                       |                 |                | × °               |                   | е<br>С             |                    |                      | -  | or samples requiring specific QC analysis etc. |
| LAB ID                                | SAMPLE ID                               | ļ               | DATE / TIME            | MATRIX     | TYPE & PRESERVATI<br>(refer to codes below | NE  <br>≬ 'B          | TOTAL<br>OTTLES | nia            | Q E               |                   | ved                | NO2                | <u>ہ د</u>           |  |  |
| 5 m                                   |   |                 |                        |            |  |                       |                 | ŭ              | 04, C             | g                 | n ssol             | 31                 | and t                |  |  |
| · · · · · · · · · · · · · · · · · · · | BH1C i                                  |                 |                        | w          |  |                       |                 | <u>ح</u>       | ZŐE               | F /               | <u>ā</u> z         | zž                 | <u>, м</u> щ         |  |  |
|                                       | ВНЗ                                     | <u>· y · 2</u>  | 3 -1-13                | w          |  |                       |                 |                | +                 | -                 |                    | •                  | <u> </u>             |  | Field Tests - pH, EC, Temp & SWL               |
|                                       |   |                 | 13:05                  |            |  |                       |                 |                | +                 | · ·               |                    | •                  |                      |  | Field Tests - pH, EC, Temp & SWL               |
|                                       | BH4                                     |                 | 12:20                  | w          | ·  |                       |                 |                |                   |                   | -                  | -                  |                      |  | Field Tests - pH, EC, Temp & SWL               |
|                                       | BH9                                     |                 | 8:40                   | w          |  |                       |                 | 1              | 1                 | 1                 | 4                  | 1                  |                      |  | Field Tests - pH, EC, Temp & SWL               |
|                                       | BH12R                                   |                 | 11:15                  | w          |  |                       |                 | 1              | -                 | 1                 | 1                  | 1                  | •                    |  | Field Tests - pH, EC, Temp & SWL               |
| · · ·                                 | BH13                                    |                 | 11:35                  | W          |  |                       | ĝs.             | ~              | 1                 | 1                 | 1                  | 1                  |                      |  | Field Tests - pH, EC, Temp & SWL               |
|                                       | BH14                                    |                 | 11:55                  | W          |  |                       | 1.2             | 1              | 11                | 1                 | 1                  | 1                  |                      |  | Field Tests - pH, EC, Temp & SWL               |
|                                       | BH15                                    |                 | 10:45                  | w          |  |                       |                 | _ ✓            | 1                 | ×                 | 1                  | 1                  |                      |  | Field Tests - pH, EC, Temp & SWL               |
| *                                     | BH19R                                   |                 | 12:45                  | w          |  |                       | · ••            | 1              | 1                 | 1                 | 1                  | 1                  |                      |  | Field Tests - pH, EC, Temp & SWL               |
|                                       | BH18                                    |                 | 8:05                   | w          |  |                       |                 | 1              | 1                 | 1                 | 1                  | 1                  |                      |  | Field Tests - pH, EC, Temp & SWL               |
|                                       | BH21                                    |                 | 10:20                  | _ Env      | vironmental Divisio                        | יי<br>כו              | 1               | *              | 4                 | 1                 | 1                  | 1                  |                      | _  | Field Tests - pH, EC, Temp & SWL               |
|                                       | BH22                                    |                 | 9:55                   | Wo         | llongong                                   |                       |                 | 1              | 1                 | 1                 | 1                  | 4                  |                      |  | Field Tests - pH, EC, Temp & SWL               |
|                                       | Duplicate                               |                 | 8:35                   |            | FW23038                                    | 54                    |                 | £              | 1                 | 19 <b>1</b>       | 1                  | 1                  |                      |  | Field Tests - pH, EC, Temp & SWL               |
| . <u></u>                             | Triplicate                              | Y               | 8:05                   | _          |  |                       |                 |                |                   |                   |                    | х.                 | 1                    |  |  |
|                                       |   |                 |                        | -          |  |                       |                 |                |                   |                   |                    |                    |                      |  |  |
|                                       |   |                 |                        | -          |  |                       | 1               | <u>в.</u><br>2 |                   |                   |                    |                    |                      |  | · · · · · · · · · · · · · · · · · · ·          |
|                                       | - 'W''                                  |                 |                        |            |  |                       |                 |                |                   |                   |                    |                    |                      |  |  |
|                                       |   |                 |                        | Tele       | phone : 02 42253125                        |                       | 10              |                |                   |                   |                    |                    |                      |  |  |
| Water Container Codes:                | P = Unpreserved Plastic; N = Nitric Pre | served Plastic; | ORC = Nitric Preserved |            |  |                       | xide Pres       | erved Plast    | ic; AG = Ambe     | or Glass Unpr     | eserved; AP -      | <br>Airfreight Un: | reserved Plastic     | ,  |  |

V = VOA Vial HCI Preserved, VS = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved, Sector Voi SG = Sulfuric Preserved Amber Glass; H = HCI preserved Plastic; HS = HCI preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetabe Preserved Bottle; E = EDTA Preserved Bottle; ST = Stenite Bottle; ST = Stenite Bottle; ASS = Plastic Bag for Acid Sulphate Scile; B = Unpreserved Bag.



# **CERTIFICATE OF ANALYSIS**

| Work Order              | EW2303854                                     | Page                    | : 1 of 8   |
|-------------------------|---|-------------------------|--|
| Client                  | SHELLHARBOUR CITY COUNCIL                     | Laboratory              | Environmental Division NSW South Coast                     |
| Contact                 | : Ryan Stirling                               | Contact                 | : Aneta Prosaroski   |
| Address                 | : LAMERTON HOUSE, LAMERTON CRESCENT           | Address                 | : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia |
|                         | SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529 |                         |  |
| Telephone               | :   | Telephone               | : +61 2 4225 3125  |
| Project                 | : Dunmore Quarterly Groundwaters EPL          | Date Samples Received   | : 01-Sep-2023 14:03  |
| Order number            | : 156810                                      | Date Analysis Commenced | : 01-Sep-2023  |
| C-O-C number            | :   | Issue Date              | 13-Sep-2023 10:20  |
| Sampler                 | : Robert DaLio                                |                         | Hac-MRA NATA   |
| Site                    | : DUNMORE LANDFILL TENDER                     |                         |  |
| Quote number            | : WO/030/19 TENDER GROUNDWATERS               |                         | The Calut  |
| No. of samples received | : 14  |                         | Accreditation No. 825<br>Accredited for compliance with    |
| No. of samples analysed | : 13  |                         | ISO/IEC 17025 - Testing                                    |

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

#### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| Signatories  | Position                    | Accreditation Category             |
|--------------|-----------------------------|------------------------------------|
| Ankit Joshi  | Senior Chemist - Inorganics | Sydney Inorganics, Smithfield, NSW |
| Robert DaLio | Sampler                     | Laboratory - Wollongong, NSW       |



#### **General Comments**

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

 $\emptyset$  = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- Analytical work for this work order will be conducted at ALS Sydney.
- ED041G: LOR raised for Sulfate on sample no.1 due to sample matrix.
- EK057G: LOR raised for Nitrite on sample no.12 due to sample matrix.
- EK059G: LOR raised for NOx on sample 12 due to sample matrix.
- EK058G: LOR raised for Nitrate on sample 12 due to sample matrix.
- EK059G: LOR raised for NOx due to sample matrix.
- EK057G/EK059G: It has been noted that Nitrite is greater than NOx on sample 8, however this difference is confirmed by re-analysis.
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Sampling and groundwater depth measurements completed by ALS Wollongong via inhouse sampling method EN/67.11 Groundwater Sampling Via Bailer Method.
- Temperature performed by ALS Wollongong via in-house method EA116 and EN67 PK.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.
- Sample collection of Ground Waters by in-house EN67 where the "surface layer of the aquifer was sampled".
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.</li>
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.



| Sub-Matrix: WATER<br>(Matrix: WATER)         |                 |       | Sample ID      | BH1C              | BH3               | BH4               | BH9               | BH12R             |
|--|-----------------|-------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|  |                 | Sampl | ng date / time | 01-Sep-2023 09:15 | 01-Sep-2023 13:05 | 01-Sep-2023 12:20 | 01-Sep-2023 08:40 | 01-Sep-2023 11:15 |
| Compound                                     | CAS Number      | LOR   | Unit           | EW2303854-001     | EW2303854-002     | EW2303854-003     | EW2303854-004     | EW2303854-005     |
|  |                 |       |                | Result            | Result            | Result            | Result            | Result            |
| EA005FD: Field pH                            |                 |       |                |                   |                   |                   |                   |                   |
| рН   |                 | 0.1   | pH Unit        | 6.9               | 7.3               | 7.3               | 7.1               | 6.8               |
| EA010FD: Field Conductivity                  |                 |       |                |                   |                   |                   |                   |                   |
| Electrical Conductivity (Non<br>Compensated) |                 | 1     | µS/cm          | 7610              | 1650              | 880               | 3760              | 1610              |
| EA116: Temperature                           |                 |       |                |                   |                   |                   |                   |                   |
| Temperature                                  |                 | 0.5   | °C             | 23.9              | 17.8              | 18.4              | 17.7              | 20.6              |
| ED037P: Alkalinity by PC Titrator            |                 |       |                |                   |                   |                   |                   |                   |
| Hydroxide Alkalinity as CaCO3                | DMO-210-001     | 1     | mg/L           | <1                | <1                | <1                | <1                | <1                |
| Carbonate Alkalinity as CaCO3                | 3812-32-6       | 1     | mg/L           | <1                | <1                | <1                | <1                | <1                |
| Bicarbonate Alkalinity as CaCO3              | 71-52-3         | 1     | mg/L           | 2760              | 483               | 381               | 1700              | 516               |
| Total Alkalinity as CaCO3                    |                 | 1     | mg/L           | 2760              | 483               | 381               | 1700              | 516               |
| ED041G: Sulfate (Turbidimetric) as SO4 2     | 2- by DA        |       |                |                   |                   |                   |                   |                   |
| Sulfate as SO4 - Turbidimetric               | 14808-79-8      | 1     | mg/L           | <10               | 210               | 115               | 167               | 184               |
| ED045G: Chloride by Discrete Analyser        |                 |       |                |                   |                   |                   |                   |                   |
| Chloride                                     | 16887-00-6      | 1     | mg/L           | 1110              | 260               | 55                | 548               | 223               |
| ED093F: Dissolved Major Cations              |                 |       |                |                   |                   |                   |                   |                   |
| Calcium                                      | 7440-70-2       | 1     | mg/L           | 135               | 137               | 132               | 216               | 183               |
| Potassium                                    | 7440-09-7       | 1     | mg/L           | 242               | 31                | 20                | 84                | 27                |
| EG020F: Dissolved Metals by ICP-MS           |                 |       |                |                   |                   |                   |                   |                   |
| Manganese                                    | 7439-96-5       | 0.001 | mg/L           | 0.116             | 0.214             | 0.118             | 0.558             | 0.539             |
| Iron   | 7439-89-6       | 0.05  | mg/L           | 9.04              | 2.90              | 3.08              | 2.45              | 9.62              |
| EK040P: Fluoride by PC Titrator              |                 |       |                |                   |                   |                   |                   |                   |
| Fluoride                                     | 16984-48-8      | 0.1   | mg/L           | 0.4               | 0.1               | 0.1               | 0.4               | 0.2               |
| EK055G: Ammonia as N by Discrete Ana         | lyser           |       |                |                   |                   |                   |                   |                   |
| Ammonia as N                                 | 7664-41-7       | 0.01  | mg/L           | 314               | 29.2              | 1.68              | 122               | 3.37              |
| EK057G: Nitrite as N by Discrete Analys      | er              |       |                |                   |                   |                   |                   |                   |
| Nitrite as N                                 | 14797-65-0      | 0.01  | mg/L           | <0.01             | 0.03              | <0.01             | <0.01             | 0.01              |
| EK058G: Nitrate as N by Discrete Analys      | ser             |       |                |                   |                   |                   |                   |                   |
| Nitrate as N                                 | 14797-55-8      | 0.01  | mg/L           | <0.10             | 0.08              | 0.14              | 0.01              | 0.15              |
| EK059G: Nitrite plus Nitrate as N (NOx)      | by Discrete Ana | lyser |                |                   |                   |                   |                   |                   |
| Nitrite + Nitrate as N                       |                 | 0.01  | mg/L           | <0.10             | 0.11              | 0.14              | 0.01              | 0.16              |
| EP005: Total Organic Carbon (TOC)            |                 |       |                |                   |                   |                   |                   |                   |
| Total Organic Carbon                         |                 | 1     | mg/L           | 222               | 22                | 11                | 58                | 21                |



| Sub-Matrix: WATER<br>(Matrix: WATER)  |            |        | Sample ID      | BH1C              | BH3               | BH4               | BH9               | BH12R             |
|---------------------------------------|------------|--------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                                       |            | Sampli | ng date / time | 01-Sep-2023 09:15 | 01-Sep-2023 13:05 | 01-Sep-2023 12:20 | 01-Sep-2023 08:40 | 01-Sep-2023 11:15 |
| Compound                              | CAS Number | LOR    | Unit           | EW2303854-001     | EW2303854-002     | EW2303854-003     | EW2303854-004     | EW2303854-005     |
|                                       |            |        |                | Result            | Result            | Result            | Result            | Result            |
| QWI-EN 67.11 Sampling of Groundwaters |            |        |                |                   |                   |                   |                   |                   |
| Standing Water Level                  |            | 0.01   | m AHD          | 3.25              | 3.13              | 4.40              | 3.25              | 4.38              |



| Sub-Matrix: WATER<br>(Matrix: WATER)         |                 |        | Sample ID       | BH13              | BH14              | BH15              | BH19R             | BH18              |
|--|-----------------|--------|-----------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|  |                 | Sampli | ing date / time | 01-Sep-2023 11:35 | 01-Sep-2023 11:55 | 01-Sep-2023 10:45 | 01-Sep-2023 12:40 | 01-Sep-2023 08:05 |
| Compound                                     | CAS Number      | LOR    | Unit            | EW2303854-006     | EW2303854-007     | EW2303854-008     | EW2303854-009     | EW2303854-010     |
|  |                 |        |                 | Result            | Result            | Result            | Result            | Result            |
| EA005FD: Field pH                            |                 |        |                 |                   |                   |                   |                   |                   |
| рН   |                 | 0.1    | pH Unit         | 6.7               | 6.8               | 7.0               | 7.3               | 6.6               |
| EA010FD: Field Conductivity                  |                 |        |                 |                   |                   |                   |                   |                   |
| Electrical Conductivity (Non<br>Compensated) |                 | 1      | µS/cm           | 2210              | 1020              | 2180              | 765               | 470               |
| EA116: Temperature                           |                 |        |                 |                   |                   |                   |                   |                   |
| Temperature                                  |                 | 0.5    | °C              | 21.5              | 21.0              | 14.3              | 18.1              | 18.6              |
| ED037P: Alkalinity by PC Titrator            |                 |        |                 |                   |                   |                   |                   |                   |
| Hydroxide Alkalinity as CaCO3                | DMO-210-001     | 1      | mg/L            | <1                | <1                | <1                | <1                | <1                |
| Carbonate Alkalinity as CaCO3                | 3812-32-6       | 1      | mg/L            | <1                | <1                | <1                | <1                | <1                |
| Bicarbonate Alkalinity as CaCO3              | 71-52-3         | 1      | mg/L            | 872               | 563               | 519               | 358               | 283               |
| Total Alkalinity as CaCO3                    |                 | 1      | mg/L            | 872               | 563               | 519               | 358               | 283               |
| ED041G: Sulfate (Turbidimetric) as SO4 2     | 2- by DA        |        |                 |                   |                   |                   |                   |                   |
| Sulfate as SO4 - Turbidimetric               | 14808-79-8      | 1      | mg/L            | 93                | 37                | 391               | 58                | 4                 |
| ED045G: Chloride by Discrete Analyser        |                 |        |                 |                   |                   |                   |                   |                   |
| Chloride                                     | 16887-00-6      | 1      | mg/L            | 330               | 36                | 459               | 48                | 13                |
| ED093F: Dissolved Major Cations              |                 |        |                 |                   |                   |                   |                   |                   |
| Calcium                                      | 7440-70-2       | 1      | mg/L            | 219               | 154               | 133               | 104               | 70                |
| Potassium                                    | 7440-09-7       | 1      | mg/L            | 29                | 16                | 153               | 42                | 9                 |
| EG020F: Dissolved Metals by ICP-MS           |                 |        |                 |                   |                   |                   |                   |                   |
| Manganese                                    | 7439-96-5       | 0.001  | mg/L            | 0.448             | 0.140             | 0.300             | 0.080             | 0.241             |
| Iron   | 7439-89-6       | 0.05   | mg/L            | 3.34              | 0.15              | 10.4              | 0.99              | 2.43              |
| EK040P: Fluoride by PC Titrator              |                 |        |                 |                   |                   |                   |                   |                   |
| Fluoride                                     | 16984-48-8      | 0.1    | mg/L            | 0.2               | 0.5               | 0.2               | 0.1               | 0.2               |
| EK055G: Ammonia as N by Discrete Anal        | lyser           |        |                 |                   |                   |                   |                   |                   |
| Ammonia as N                                 | 7664-41-7       | 0.01   | mg/L            | 8.64              | 1.42              | 6.24              | 3.05              | 1.44              |
| EK057G: Nitrite as N by Discrete Analyse     | er              |        |                 |                   |                   |                   |                   |                   |
| Nitrite as N                                 | 14797-65-0      | 0.01   | mg/L            | <0.01             | <0.01             | 0.03              | <0.01             | <0.01             |
| EK058G: Nitrate as N by Discrete Analys      | ser             |        |                 |                   |                   |                   |                   |                   |
| Nitrate as N                                 | 14797-55-8      | 0.01   | mg/L            | 4.43              | 1.03              | <0.01             | 0.06              | <0.01             |
| EK059G: Nitrite plus Nitrate as N (NOx)      | by Discrete Ana | lyser  |                 |                   |                   |                   |                   |                   |
| Nitrite + Nitrate as N                       |                 | 0.01   | mg/L            | 4.43              | 1.03              | 0.01              | 0.06              | <0.01             |
| EP005: Total Organic Carbon (TOC)            |                 |        |                 |                   |                   |                   |                   |                   |
| Total Organic Carbon                         |                 | 1      | mg/L            | 36                | 12                | 37                | 13                | 14                |



| Sub-Matrix: WATER<br>(Matrix: WATER)  |            |        | Sample ID      | BH13              | BH14              | BH15              | BH19R             | BH18              |
|---------------------------------------|------------|--------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                                       |            | Sampli | ng date / time | 01-Sep-2023 11:35 | 01-Sep-2023 11:55 | 01-Sep-2023 10:45 | 01-Sep-2023 12:40 | 01-Sep-2023 08:05 |
| Compound                              | CAS Number | LOR    | Unit           | EW2303854-006     | EW2303854-007     | EW2303854-008     | EW2303854-009     | EW2303854-010     |
|                                       |            |        |                | Result            | Result            | Result            | Result            | Result            |
| QWI-EN 67.11 Sampling of Groundwaters |            |        |                |                   |                   |                   |                   |                   |
| Standing Water Level                  |            | 0.01   | m AHD          | 4.39              | 4.83              | 0.89              | 4.56              | 2.28              |



| Sub-Matrix: WATER<br>(Matrix: WATER)          |             |        | Sample ID      | BH21              | BH22              | Duplicate         | <br> |
|---|-------------|--------|----------------|-------------------|-------------------|-------------------|------|
|   |             | Sampli | ng date / time | 01-Sep-2023 10:20 | 01-Sep-2023 09:55 | 01-Sep-2023 08:05 | <br> |
| Compound C/                                   | AS Number   | LOR    | Unit           | EW2303854-011     | EW2303854-012     | EW2303854-013     | <br> |
|   |             |        |                | Result            | Result            | Result            | <br> |
| EA005FD: Field pH                             |             |        |                |                   |                   |                   |      |
| рН  |             | 0.1    | pH Unit        | 6.9               | 6.6               | 6.6               | <br> |
| EA010FD: Field Conductivity                   |             |        |                |                   |                   |                   |      |
| Electrical Conductivity (Non<br>Compensated)  |             | 1      | μS/cm          | 2310              | 1470              | 470               | <br> |
| EA116: Temperature                            |             |        |                |                   |                   |                   |      |
| Temperature                                   |             | 0.5    | °C             | 20.8              | 17.5              | 18.6              | <br> |
| ED037P: Alkalinity by PC Titrator             |             |        |                |                   |                   |                   |      |
| Hydroxide Alkalinity as CaCO3 DN              | NO-210-001  | 1      | mg/L           | <1                | <1                | <1                | <br> |
| Carbonate Alkalinity as CaCO3                 | 3812-32-6   | 1      | mg/L           | <1                | <1                | <1                | <br> |
| Bicarbonate Alkalinity as CaCO3               | 71-52-3     | 1      | mg/L           | 783               | 428               | 279               | <br> |
| Total Alkalinity as CaCO3                     |             | 1      | mg/L           | 783               | 428               | 279               | <br> |
| ED041G: Sulfate (Turbidimetric) as SO4 2- by  | DA          |        |                |                   |                   |                   |      |
| Sulfate as SO4 - Turbidimetric                | 14808-79-8  | 1      | mg/L           | 183               | 326               | 4                 | <br> |
| ED045G: Chloride by Discrete Analyser         |             |        |                |                   |                   |                   |      |
| Chloride                                      | 16887-00-6  | 1      | mg/L           | 328               | 147               | 13                | <br> |
| ED093F: Dissolved Major Cations               |             |        |                |                   |                   |                   |      |
| Calcium                                       | 7440-70-2   | 1      | mg/L           | 196               | 159               | 71                | <br> |
| Potassium                                     | 7440-09-7   | 1      | mg/L           | 28                | 16                | 9                 | <br> |
| EG020F: Dissolved Metals by ICP-MS            |             |        |                |                   |                   |                   |      |
| Manganese                                     | 7439-96-5   | 0.001  | mg/L           | 0.231             | 0.279             | 0.242             | <br> |
| Iron  | 7439-89-6   | 0.05   | mg/L           | 0.16              | 25.9              | 2.46              | <br> |
| EK040P: Fluoride by PC Titrator               |             |        |                |                   |                   |                   |      |
| Fluoride                                      | 16984-48-8  | 0.1    | mg/L           | 0.3               | 0.3               | 0.2               | <br> |
| EK055G: Ammonia as N by Discrete Analyser     |             |        |                |                   |                   |                   |      |
| Ammonia as N                                  | 7664-41-7   | 0.01   | mg/L           | 1.92              | 5.14              | 1.31              | <br> |
| EK057G: Nitrite as N by Discrete Analyser     |             |        |                |                   |                   |                   |      |
| Nitrite as N                                  | 14797-65-0  | 0.01   | mg/L           | 0.06              | <0.10             | <0.01             | <br> |
| EK058G: Nitrate as N by Discrete Analyser     |             |        |                |                   |                   |                   |      |
| Nitrate as N                                  | 14797-55-8  | 0.01   | mg/L           | 23.7              | <0.10             | <0.01             | <br> |
| EK059G: Nitrite plus Nitrate as N (NOx) by Di | iscrete Ana | lyser  |                |                   |                   |                   |      |
| Nitrite + Nitrate as N                        |             | 0.01   | mg/L           | 23.8              | <0.10             | <0.01             | <br> |
| EP005: Total Organic Carbon (TOC)             |             |        |                |                   |                   |                   |      |
| Total Organic Carbon                          |             | 1      | mg/L           | 29                | 33                | 15                | <br> |



| Sub-Matrix: WATER<br>(Matrix: WATER)  |            |              | Sample ID      | BH21              | BH22              | Duplicate         | <br> |
|---------------------------------------|------------|--------------|----------------|-------------------|-------------------|-------------------|------|
|                                       |            | Samplii      | ng date / time | 01-Sep-2023 10:20 | 01-Sep-2023 09:55 | 01-Sep-2023 08:05 | <br> |
| Compound                              | CAS Number | ber LOR Unit |                | EW2303854-011     | EW2303854-012     | EW2303854-013     | <br> |
|                                       |            |              |                | Result            | Result            | Result            | <br> |
| QWI-EN 67.11 Sampling of Groundwaters |            |              |                |                   |                   |                   |      |
| Standing Water Level                  |            | 0.01         | m AHD          | 3.15              | 2.42              | 2.38              | <br> |

#### Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) ED093F: Dissolved Major Cations

(WATER) EP005: Total Organic Carbon (TOC)

(WATER) EK055G: Ammonia as N by Discrete Analyser

(WATER) EG020F: Dissolved Metals by ICP-MS

(WATER) EK057G: Nitrite as N by Discrete Analyser

(WATER) EK058G: Nitrate as N by Discrete Analyser

(WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser

(WATER) ED045G: Chloride by Discrete Analyser

(WATER) ED037P: Alkalinity by PC Titrator

(WATER) EK040P: Fluoride by PC Titrator

(WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA

ALS

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| CLIENT:                | Shellharbour City Council                  |                                   | TURNARO                          | UND REQUIREMENTS :   | Standa                           | ard TAT (List    | due date):   |  |                                      |                                   |                                    | FOR                                 | LABORAT                                 | ORY USE O                 | NLY (Circle)  |
|------------------------|--|-----------------------------------|----------------------------------|--|----------------------------------|------------------|--------------|--|--------------------------------------|-----------------------------------|------------------------------------|-------------------------------------|---|---------------------------|---|
| OFFICE:                | 41 Burelli St WOLLONGONG NSW               | 2500                              | (Standard TAT<br>e.g., Ultra Tra | F may be longer for some tests<br>ce Organics)                   | 🛛 Non Si                         | tandard or urg   | jent TAT (L  | ist due date)                                  | 15                                   |                                   |                                    | Custo                               | xly Seal Intec                          | n                         | Yaa No Nia  |
| PROJECT:               | Dunmore Quarterly Leachate                 |                                   | ALS QUOT                         | E NO.: WO/0  | 30/19 TENDI                      | ER               |              |  | COC SEQU                             | ENCE NUME                         | ER (Circle)                        | E fee<br>recei                      | ice / frozen ic<br>p17                  | e blicks prese            | ntupon (Yes) Na WA  |
| ORDER NUMBER:          |  |                                   |                                  |  |                                  |                  | -            | coc:   | 1 2                                  | 34                                | 56                                 | 7 Rand                              | om Sample T                             | emperature or             | Receipt S / C   |
| PROJECT MANAGER:       | Ryan Stirling                              |                                   |                                  |  |                                  |                  |              | OF:  | 1 2                                  | 3 4                               | 56                                 | 7 Other                             | comment                                 |                           | 70  |
| SAMPLER:               | obert Dal                                  | SAMPLER N                         | IOBILE:                          |  | RELINQUE                         | SHED BY:         |              | RECI   | EIVED BY:                            |                                   |                                    | RELINQUI                            | SHED BY:                                | ÷                         | RECEIVED BY:  |
| COC emailed to ALS? (  | YES / NO)                                  | EDD FORMA                         | AT (or default                   | :):  | 166                              | ert l            | 24-          | -  | An                                   | J.A.                              |                                    |                                     |   |                           |   |
| Email Reports to :     |  |                                   |                                  |  | DATE/TIME                        | :<br>            |              | DATE   | E/TIME:                              |                                   |                                    | DATE/TIM                            | E: *                                    |                           | DATE/TIME:  |
| Email Invoice to :     |  |                                   |                                  |  | 5.                               | 9.23             | >            |  | 51                                   | 71.                               | 23                                 |                                     |   |                           |   |
| COMMENTS/SPECIAL       | HANDLING/STORAGE OR DISPOSA                | L: CC reports to:                 |                                  |  | •                                |                  |              |  |                                      |                                   |                                    |                                     |   |                           |   |
| ALS USE ONLY           | SAMPLI<br>MATRIX: So                       | E DETAILS<br>lid(S) Water(W)      |                                  | CONTAINER INF  | ORMATION                         |                  | ANALY:       | SIS REQUIR<br>re Metals are requ               | ED includir<br>Jired, specify To     | ng SUITES (<br>stal (unfiltered b | NB. Suite Co<br>ottle required) or | des must be lis<br>Dissolved (field | sted to attract<br>I filtered bottle re | suite price)<br>:quired). | Additional Information  |
| LAB ID                 | SAMPLE ID                                  | DATE / TIME                       | MATRIX                           | TYPE & PRESERVAI<br>(refer to codes belo                         | rive<br>w)                       | TOTAL<br>BOTTLES | Ammonia      | NT-2A (Aika,<br>So4, Ct, Fl)<br>Filtered Ca, K | TOC                                  | Total Fe & Mn                     | NT-4 (NO2,<br>NO3)                 |                                     |   |                           | Comments on likely contaminant levels, dilutions,<br>or samples requiring specific QC analysis etc. |
|                        | Leachate Storage Tank - LP1                | 5.9.23. 10.                       | 5 w                              |  |                                  |                  | 1            | 1  | 4                                    | 1                                 | 1                                  |                                     |   |                           | Field Tests - pH, EC, Temp & DO   |
|                        |  | 12.71                             | 21                               |  |                                  |                  |              |  |                                      |                                   |                                    |                                     |   |                           |   |
|                        |  | - 51                              | 4,9                              |  |                                  |                  |              |  |                                      |                                   |                                    |                                     |   |                           |   |
|                        |  |                                   |                                  |  |                                  |                  |              |  |                                      |                                   |                                    |                                     |   |                           |   |
|                        |  |                                   |                                  |  |                                  |                  |              |  | · · · ·                              |                                   |                                    |                                     | ļ                                       |                           |   |
|                        |  |                                   |                                  |  |                                  |                  |              |  |                                      |                                   |                                    |                                     |   |                           |   |
|                        |  |                                   |                                  |  |                                  |                  |              |  |                                      |                                   |                                    |                                     |   |                           |   |
|                        |  |                                   |                                  |  |                                  |                  |              |  |                                      |                                   |                                    |                                     |   |                           |   |
|                        |  |                                   |                                  |  |                                  |                  |              |  |                                      |                                   |                                    | 1                                   |   |                           |   |
|                        |  |                                   |                                  |  |                                  |                  |              |  |                                      |                                   | Envi                               | ronmer                              | ntal Div                                | <b>is</b> ion             |   |
|                        |  |                                   |                                  |  |                                  |                  |              |  |                                      |                                   | W W                                | ork Orde                            | ∮<br>r Refere                           | nce                       |   |
|                        |  |                                   |                                  |  |                                  |                  | ·<br>·       |  | •                                    |                                   | E                                  | :W2                                 | 303                                     | 859                       |   |
|                        |  |                                   |                                  |  |                                  |                  |              |  |                                      |                                   | -                                  |                                     |   |                           |   |
|                        |  |                                   |                                  |  |                                  |                  |              |  |                                      |                                   | -                                  |                                     |   |                           |   |
|                        |  |                                   |                                  |  |                                  |                  |              |  |                                      |                                   |                                    |                                     | WHY.                                    |                           | <u>ا</u> ــــــــــــــــــــــــــــــــــــ   |
|                        |  |                                   |                                  |  |                                  |                  |              |  |                                      |                                   |                                    |                                     |   |                           | · · · · · · · · · · · · · · · · · · ·   |
| 4                      |  |                                   |                                  |  |                                  |                  |              |  |                                      |                                   | - Teleph                           | one : 02 422                        | 253125                                  |                           |   |
|                        |  |                                   |                                  |  | TOTAL                            | 10               |              |  |                                      |                                   |                                    |                                     |   |                           |   |
| Water Container Codes: | P = Unpreserved Plastic; N = Nitric Preser | ved Plastic; ORC = Nitric Preserv | ed ORC; SH =                     | Sodium Hydroxide/Cd Preserve<br>freight Lingresenved Viel SG = 1 | d; S = Sodium<br>Sulfuric Preser | Hydroxide Pre    | eserved Plas | tic; AG = Amb                                  | <br>er Glass Un pr<br>leetic: HS = I | eserved; AP                       | Airfreight Un                      | preserved Plas                      | stic                                    | ed Plastic: E =           | Formaldahuda Prasaruad Glass  |

V = VOA Vial HCI Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCI preserved Plastic; HS = HCI preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Vial SG = Sulfuric Preserved Amber Glass; H = HCI preserved Plastic; HS = HCI preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Vial SG = Sulfuric Preserved Bastic; HS = HCI preserved Plastic; HS = HCI preserved Bastic; HS = HCI preserved Plastic; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Vial SG = Sulfuric Preserved Bastic; HS = HCI preserved Plastic; HS = HCI preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Bastic; B = Unpreserved Bastic; HS = HCI preserved Bastic; SP = Sulfuric Preserved Plastic; Bastic Bastic; astic; Bastic Bastic; Bastic Bastic; Bastic Bastic; Bastic Bastic; Bastic Bastic; Bastic Bastic; Bastic Bastic; Bastic Bastic; Bastic Bastic; Bastic Bastic; Bastic Bastic; Bastic Bastic; Bastic Bastic; Bastic Bastic; Bastic Bastic; Bastic Bastic; Bastic Bastic; Bastic Bastic Bastic; Bastic Bastic; Bastic Bastic; Bastic Bastic; Bastic Bastic; Bastic Bastic; Bastic Bastic; Bastic Bastic; Bastic Bastic; Bastic Bastic; Bastic Bastic; Bastic Bastic; Bastic Bastic; Bastic Bastic; Bastic Bastic; Bastic Bastic; Ba



# **CERTIFICATE OF ANALYSIS**

| Work Order              | EW2303859                                     | Page                    | : 1 of 4   |
|-------------------------|---|-------------------------|--|
| Client                  | SHELLHARBOUR CITY COUNCIL                     | Laboratory              | Environmental Division NSW South Coast                     |
| Contact                 | : Ryan Stirling                               | Contact                 | : Aneta Prosaroski   |
| Address                 | : LAMERTON HOUSE, LAMERTON CRESCENT           | Address                 | : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia |
|                         | SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529 |                         |  |
| Telephone               | :   | Telephone               | : +61 2 4225 3125  |
| Project                 | : Dunmore Quarterly Leachate Tank EPL         | Date Samples Received   | : 05-Sep-2023 13:52  |
| Order number            | : 156810                                      | Date Analysis Commenced | : 05-Sep-2023  |
| C-O-C number            | :   | Issue Date              | 11-Sep-2023 19:56  |
| Sampler                 | : Robert DaLio                                |                         | Hac-MRA NATA   |
| Site                    | : DUNMORE LANDFILL TENDER                     |                         |  |
| Quote number            | : WO/030/19 TENDER LEACHATE                   |                         | The Contraction of the second                              |
| No. of samples received | : 1   |                         | Accreditation No. 825<br>Accredited for compliance with    |
| No. of samples analysed | : 1   |                         | ISO/IEC 17025 - Testing                                    |

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

#### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| Signatories  | Position                    | Accreditation Category             |
|--------------|-----------------------------|------------------------------------|
| Ankit Joshi  | Senior Chemist - Inorganics | Sydney Inorganics, Smithfield, NSW |
| Robert DaLio | Sampler                     | Laboratory - Wollongong, NSW       |



#### **General Comments**

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

- Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
  - LOR = Limit of reporting
  - ^ = This result is computed from individual analyte detections at or above the level of reporting
  - ø = ALS is not NATA accredited for these tests.
  - ~ = Indicates an estimated value.
- Analytical work for this work order will be conducted at ALS Sydney.
- ED041G: LOR raised for Sulfate due to sample matrix
- EK059G: LOR raised for NOx due to sample matrix.
- It has been noted that Nitrite is greater than NOx, however these results have been confirmed by reanalysis
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Temperature performed by ALS Wollongong via in-house method EA116 and EN67 PK.
- Dissolved oxygen (DO) performed by ALS Wollongong via in-house method EP025FD and EN67 PK.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.10 Wastewaters
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.</li>
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.



| Sub-Matrix: WATER<br>(Matrix: WATER)      |             |        | Sample ID      | Leachate Storage<br>Tank<br>LP1 | <br> | <br> |
|---|-------------|--------|----------------|---------------------------------|------|------|
|   |             | Sampli | ng date / time | 05-Sep-2023 10:10               | <br> | <br> |
| Compound                                  | CAS Number  | LOR    | Unit           | EW2303859-001                   | <br> | <br> |
|   |             |        |                | Result                          | <br> | <br> |
| EA005FD: Field pH                         |             |        |                |                                 |      |      |
| рН  |             | 0.1    | pH Unit        | 8.9                             | <br> | <br> |
| EA010FD: Field Conductivity               |             |        |                |                                 |      |      |
| Electrical Conductivity (Non              |             | 1      | µS/cm          | 8180                            | <br> | <br> |
| Compensated)                              |             |        |                |                                 |      |      |
| EA015: Total Dissolved Solids dried at 18 | 80 ± 5 °C   |        |                |                                 |      |      |
| Total Dissolved Solids @180°C             |             | 10     | mg/L           | 5280                            | <br> | <br> |
| EA116: Temperature                        |             |        |                |                                 |      |      |
| Temperature                               |             | 0.5    | °C             | 19.9                            | <br> | <br> |
| ED037P: Alkalinity by PC Titrator         |             |        |                |                                 |      |      |
| Hydroxide Alkalinity as CaCO3             | DMO-210-001 | 1      | mg/L           | <1                              | <br> | <br> |
| Carbonate Alkalinity as CaCO3             | 3812-32-6   | 1      | mg/L           | 743                             | <br> | <br> |
| Bicarbonate Alkalinity as CaCO3           | 71-52-3     | 1      | mg/L           | 1970                            | <br> | <br> |
| Total Alkalinity as CaCO3                 |             | 1      | mg/L           | 2710                            | <br> | <br> |
| ED041G: Sulfate (Turbidimetric) as SO4 2  | 2- by DA    |        |                |                                 |      |      |
| Sulfate as SO4 - Turbidimetric            | 14808-79-8  | 1      | mg/L           | <100                            | <br> | <br> |
| ED045G: Chloride by Discrete Analyser     |             |        |                |                                 |      |      |
| Chloride                                  | 16887-00-6  | 1      | mg/L           | 2030                            | <br> | <br> |
| ED093F: Dissolved Major Cations           |             |        |                |                                 |      |      |
| Calcium                                   | 7440-70-2   | 1      | mg/L           | 45                              | <br> | <br> |
| Potassium                                 | 7440-09-7   | 1      | mg/L           | 349                             | <br> | <br> |
| EG020T: Total Metals by ICP-MS            |             |        |                |                                 |      |      |
| Manganese                                 | 7439-96-5   | 0.001  | mg/L           | 0.108                           | <br> | <br> |
| Iron                                      | 7439-89-6   | 0.05   | mg/L           | 1.67                            | <br> | <br> |
| EK040P: Fluoride by PC Titrator           |             |        |                |                                 |      |      |
| Fluoride                                  | 16984-48-8  | 0.1    | mg/L           | 0.2                             | <br> | <br> |
| EK055G: Ammonia as N by Discrete Ana      | lyser       |        |                |                                 |      |      |
| Ammonia as N                              | 7664-41-7   | 0.01   | mg/L           | 391                             | <br> | <br> |
| EK057G: Nitrite as N by Discrete Analys   | er          |        |                |                                 |      | <br> |
| Nitrite as N                              | 14797-65-0  | 0.01   | mg/L           | 12.2                            | <br> | <br> |
| EK058G: Nitrate as N by Discrete Analys   | ser         |        |                |                                 | ·    |      |
| Nitrate as N                              | 14797-55-8  | 0.01   | mg/L           | <2.00                           | <br> | <br> |



| Sub-Matrix: WATER<br>(Matrix: WATER)      |                 |        | Sample ID      | Leachate Storage<br>Tank<br>LP1 | <br> | <br> |
|---|-----------------|--------|----------------|---------------------------------|------|------|
|   |                 | Sampli | ng date / time | 05-Sep-2023 10:10               | <br> | <br> |
| Compound                                  | CAS Number      | LOR    | Unit           | EW2303859-001                   | <br> | <br> |
|   |                 |        |                | Result                          | <br> | <br> |
| EK059G: Nitrite plus Nitrate as N (NOx) t | oy Discrete Ana | lyser  |                |                                 |      |      |
| Nitrite + Nitrate as N                    |                 | 0.01   | mg/L           | <2.00                           | <br> | <br> |
| EP005: Total Organic Carbon (TOC)         |                 |        |                |                                 |      |      |
| Total Organic Carbon                      |                 | 1      | mg/L           | 405                             | <br> | <br> |
| EP025FD: Field Dissolved Oxygen           |                 |        |                |                                 |      |      |
| Dissolved Oxygen                          |                 | 0.01   | mg/L           | 5.25                            | <br> | <br> |
| Dissolved Oxygen - % Saturation           |                 | 0.1    | % saturation   | 60.3                            | <br> | <br> |

#### Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) ED093F: Dissolved Major Cations

(WATER) EP005: Total Organic Carbon (TOC)

(WATER) EK055G: Ammonia as N by Discrete Analyser

(WATER) EG020T: Total Metals by ICP-MS

(WATER) EK057G: Nitrite as N by Discrete Analyser

(WATER) EK058G: Nitrate as N by Discrete Analyser

(WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser

(WATER) EA015: Total Dissolved Solids dried at 180 ± 5 °C

(WATER) ED045G: Chloride by Discrete Analyser

(WATER) ED037P: Alkalinity by PC Titrator

(WATER) EK040P: Fluoride by PC Titrator

(WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA



#### CHAIN OF CUSTODY ALS Laboratory: please tick →

Sydney: 277 Woodpark Rd. Smithfield NSW 2176
Ph. 02 8784 8555 Eisamples.sydney@alsenviro.com

D Brisbane: 32 Shand St. Statford QLD 4053 Ph:07 3243 7222 E:samples brisbane@alsenviro.com Newcastle: 5 Rosegum R4, Warabrook NSW 2304
 Townsville: 14-15 Desma CL Bohle CLD 4818
 Ph:02 4968 9433 Eisamples newcastle@alserwino.com
 Ph:07 4796 0600 E: towrsville environmenta@alserwino.com

 Melbourne: 2-4 Westail Rd. Springvale VIC 3171 Ph:03 8549 9600 E: samples.melbourne@alsenviro.com D Adelaide: 2-1 Burma Rd. Pooraka SA 5095 Ph: 08 8359 0890 E:adelaide@alsenviro.com

Cl. Perth: 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7655 E' samples.perth@alsenviro.com CI Launceston: 27 Wellington St. Launceston TAS 7250 Ph: 03 6331 2158 E: launceston@alsenviro.com

| CLIENT:            | Shellharbour City Council            | TURNAROUND REQUIREMENT  | S: Standard TAT (List due date):         |                             | FOR LABORATORY USE ONLY (Circle)          |              |  |  |
|--------------------|--------------------------------------|---|--|-----------------------------|---|--------------|--|--|
| OFFICE:            | 41 Burelli St WOLLONGONG NSW 2500    | (Standard TAT may be longer for some<br>e.g Ultra Trace Organics) | tests D Non Standard or urgent TAT (List | due date):                  | Custoriy Seal Intact?                     | Yes No 👬     |  |  |
| PROJECT:           | Dunmore Quarterly Surface Waters EPL | ALS QUOTE NO.: WO/030/19  | TENDER                                   | COC SEQUENCE NUMBER (Circle | ) Free ice / Frozen ice bricks present up |              |  |  |
| ORDER NUMBER:      | :                                    |   |  | coc: 1 2 3 4 5 6            | 7 Rendom Sample Temperature on Rec        | AR COT       |  |  |
| PROJECT MANAG      | BER: Ryan Stirling                   |   |  | OF: 1 2 3 4 5 6             | 7 Other continent                         | 10           |  |  |
| SAMPLER:           | Obert Dalis                          | SAMPLER MOBILE:   | RELINQUISHED BY:                         | RECEIVED BY:                | RELINQUISHED BY:                          | RECEIVED BY: |  |  |
| COC emailed to AL  | LS? (YES / NO)                       | EDD FORMAT (or default):  | Bebert Dation                            | Anoly                       |   |              |  |  |
| Email Reports to : | :                                    |   | DATE/TIME:                               |                             | DATE/TIME:                                | DATE/TIME:   |  |  |
| Email Invoice to : |                                      | · · · · ·   | 5.9.17                                   | 5/9/23                      |   |              |  |  |
|                    |                                      |   |  |                             |   |              |  |  |

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: CC reports to:

| ALS USE ONLY   | SAMP<br>MATRIX: S   | LE DETAILS<br>solid(S) Wate         | S<br>er(W)                                    |                                  | CONTAINER INFORMATION AI                         |                  |               | 'SIS REQUIR<br>e Metals are requ | RED includio             | uite price)<br>uired). | Additional Information               |                |                         |         |  |
|--|---|-------------------------------------|---|----------------------------------|--|------------------|---------------|----------------------------------|--------------------------|------------------------|--------------------------------------|----------------|-------------------------|---------|--|
| LAB ID   | SAMPLE ID   | DA                                  | NTE / TIME                                    | MATRIX                           | TYPE & PRESERVATIVE<br>(refer to codes below)    | TOTAL<br>BOTTLES | TSS           | NT-1, NT-2A<br>(Ionic Balance)   | TOC, NT-4, NH3, Total Mn | Dissolved and Total Fe | Turbidity                            | NH3, NH4 & NO3 | TSS, TDS, TOC, Total Mn |         | Comments on likely contaminant levels,<br>dilutions, or samples requiring specific QC<br>analysis etc. |
|  | SWP1  | 3.9.2                               | 3 9:3=  | s w                              |  |                  | 1             | 1                                | 1                        | 1                      |                                      |                |                         |         | Field Tests - pH, EC, DO & Temp  |
|  | SWC_2   | 1                                   | 8:4:  | s w                              |  |                  |               |                                  |                          | 1                      | 1                                    | 1              | 1                       |         | Field Tests - pH, EC, DO & Temp  |
|  | SWC_UP  |                                     | 7:5   | w د                              |  |                  |               | 1                                |                          | 1                      | 1                                    | 4              | 1                       |         | Field Tests - pH, EC, DO & Temp  |
|  | SWC_DOWN  |                                     | 8 K   | w C                              |  |                  |               | 1                                |                          | 1                      | 1                                    | 1              | 1                       |         | Field Tests - pH, EC, DO & Temp  |
|  | SWC_DOWN_2  |                                     | 8:20  | > w                              |  |                  |               | 1                                |                          | 1                      | 1                                    | 1              | ×                       |         | Field Tests - pH, EC, DO & Temp  |
|  | Duplicate   | ł                                   | · 8:42  | w                                |  |                  |               | 1                                |                          | 1                      | 1                                    | ~              | 1                       |         | Field Tests - pH, EC, DO & Temp  |
|  |   |                                     |   |                                  | · · · · ·  |                  |               |                                  | •                        | Envi<br>Woll<br>W      | ronmen<br>ongong<br>ork Order<br>W2: | Referen        | ision<br>862            |         |  |
| Water Container Codes:                                 | P = Unpreserved Plastic; N = Nitric Preser  | Ved Plastic; Of                     | RC = Nitric Preserve                          | d ORC; SH =                      | TOT<br>Sodium Hydroxide/Cd Preserved; S = Sodium | Als 10           | rved Plastic: | AG = Amber G                     | jass Unprese             |                        |                                      |                |                         |         |  |
| V = VOA Vial HCI Preserve<br>Z = Zinc Acetate Preserve | ed; VB = VOA Vial Sodium Bisulphate Prese<br>d Bottle; E = EDTA Preserved Bottles; ST = 3 | rved; VS = VO/<br>Sterile Bottle; / | A Vial Sulfuric Prese<br>ASS = Plastic Bag fo | rved; AV = Air<br>r Acid Sulphat | reight Unpreserved Vial SG = Sulfuric Preser     | ved Amber Glass  | ; H = HCIp    | reserved Plasti                  | ic; HS = HCI             | Telepho                | ne : 02.4226                         | 3125           |                         | i = For | maldehyde Preserved Glass;   |



# **CERTIFICATE OF ANALYSIS**

| Work Order              | EW2303862                                     | Page                    | : 1 of 7   |
|-------------------------|---|-------------------------|--|
| Client                  | SHELLHARBOUR CITY COUNCIL                     | Laboratory              | Environmental Division NSW South Coast                     |
| Contact                 | : Ryan Stirling                               | Contact                 | : Aneta Prosaroski   |
| Address                 | : LAMERTON HOUSE, LAMERTON CRESCENT           | Address                 | : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia |
|                         | SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529 |                         |  |
| Telephone               | :   | Telephone               | : +61 2 4225 3125  |
| Project                 | : Dunmore Quarterly Surface Water EPL         | Date Samples Received   | : 05-Sep-2023 13:42  |
| Order number            | : 156810                                      | Date Analysis Commenced | : 05-Sep-2023  |
| C-O-C number            | :   | Issue Date              | 12-Sep-2023 10:55  |
| Sampler                 | : Robert DaLio                                |                         | Hac-MRA NATA   |
| Site                    | : DUNMORE LANDFILL TENDER                     |                         |  |
| Quote number            | : WO/030/19 TENDER SURFACE WATER              |                         | The Contraction  |
| No. of samples received | : 6   |                         | Accreditation No. 825<br>Accredited for compliance with    |
| No. of samples analysed | : 6   |                         | ISO/IEC 17025 - Testing                                    |

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

#### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| Signatories  | Position                    | Accreditation Category             |
|--------------|-----------------------------|------------------------------------|
| Ankit Joshi  | Senior Chemist - Inorganics | Sydney Inorganics, Smithfield, NSW |
| Robert DaLio | Sampler                     | Laboratory - Wollongong, NSW       |



#### **General Comments**

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LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- Analytical work for this work order will be conducted at ALS Sydney.
- As per QWI EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions Chloride, Alkalinity and Sulfate; and Major Cations Calcium, Magnesium, Potassium and Sodium.
   Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- EG020: LOR's have been raised due to matrix interference.
- TDS by method EA-015 may bias high for all samples due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.6 Rivers and Streams.
- Temperature performed by ALS Wollongong via in-house method EA116 and EN67 PK.
- Dissolved oxygen (DO) performed by ALS Wollongong via in-house method EP025FD and EN67 PK.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.</li>
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.



| Sub-Matrix: WATER<br>(Matrix: WATER)         |             |        | Sample ID      | SWP1<br>Point 1   | SWC_2<br>Point 19 | SWC_UP<br>Point 20 | SWC_Down<br>Point 21 | SWC_DOWN_2<br>Point 22 |
|--|-------------|--------|----------------|-------------------|-------------------|--------------------|----------------------|------------------------|
|  |             | Sampli | ng date / time | 05-Sep-2023 09:35 | 05-Sep-2023 08:45 | 05-Sep-2023 07:50  | 05-Sep-2023 08:10    | 05-Sep-2023 08:20      |
| Compound                                     | CAS Number  | LOR    | Unit           | EW2303862-001     | EW2303862-002     | EW2303862-003      | EW2303862-004        | EW2303862-005          |
|  |             |        |                | Result            | Result            | Result             | Result               | Result                 |
| EA005FD: Field pH                            |             |        |                |                   |                   |                    |                      |                        |
| рН   |             | 0.1    | pH Unit        | 7.7               | 7.3               | 7.2                | 7.4                  | 7.4                    |
| EA010FD: Field Conductivity                  |             |        |                |                   |                   |                    |                      |                        |
| Electrical Conductivity (Non<br>Compensated) |             | 1      | μS/cm          | 788               | 26800             | 22000              | 30300                | 18800                  |
| EA015: Total Dissolved Solids dried at       | 180 ± 5 °C  |        |                |                   |                   |                    |                      |                        |
| Total Dissolved Solids @180°C                |             | 10     | mg/L           |                   | 21100             | 17800              | 24800                | 14800                  |
| EA025: Total Suspended Solids dried a        | t 104 ± 2°C |        |                |                   |                   |                    |                      |                        |
| Suspended Solids (SS)                        |             | 5      | mg/L           | <5                | <5                | <5                 | <5                   | <5                     |
| EA045: Turbidity                             |             |        |                |                   |                   |                    |                      |                        |
| Turbidity                                    |             | 0.1    | NTU            | 2.2               | 3.5               | 4.6                | 3.0                  | 4.6                    |
| EA116: Temperature                           |             |        |                |                   |                   |                    |                      |                        |
| Temperature                                  |             | 0.5    | °C             | 14.6              | 15.6              | 15.4               | 15.7                 | 14.7                   |
| ED037P: Alkalinity by PC Titrator            |             |        |                |                   |                   |                    |                      |                        |
| Hydroxide Alkalinity as CaCO3                | DMO-210-001 | 1      | mg/L           | <1                | <1                | <1                 | <1                   | <1                     |
| Carbonate Alkalinity as CaCO3                | 3812-32-6   | 1      | mg/L           | <1                | <1                | <1                 | <1                   | <1                     |
| Bicarbonate Alkalinity as CaCO3              | 71-52-3     | 1      | mg/L           | 316               | 163               | 169                | 160                  | 150                    |
| Total Alkalinity as CaCO3                    |             | 1      | mg/L           | 316               | 163               | 169                | 160                  | 150                    |
| ED041G: Sulfate (Turbidimetric) as SO4       | 4 2- by DA  |        |                |                   |                   |                    |                      |                        |
| Sulfate as SO4 - Turbidimetric               | 14808-79-8  | 1      | mg/L           | 23                | 1720              | 922                | 1840                 | 795                    |
| ED045G: Chloride by Discrete Analyser        | r           |        |                |                   |                   |                    |                      |                        |
| Chloride                                     | 16887-00-6  | 1      | mg/L           | 145               | 10000             | 8240               | 11300                | 7170                   |
| ED093F: Dissolved Major Cations              |             |        |                |                   |                   |                    |                      |                        |
| Calcium                                      | 7440-70-2   | 1      | mg/L           | 58                | 283               | 253                | 315                  | 214                    |
| Magnesium                                    | 7439-95-4   | 1      | mg/L           | 26                | 726               | 608                | 843                  | 508                    |
| Sodium                                       | 7440-23-5   | 1      | mg/L           | 127               | 5940              | 5060               | 6970                 | 4310                   |
| Potassium                                    | 7440-09-7   | 1      | mg/L           | 18                | 250               | 190                | 247                  | 165                    |
| EG020F: Dissolved Metals by ICP-MS           |             |        |                |                   |                   |                    |                      |                        |
| Iron   | 7439-89-6   | 0.05   | mg/L           | 0.06              | <0.10             | 0.08               | <0.10                | <0.05                  |
| EG020T: Total Metals by ICP-MS               |             |        |                |                   |                   |                    |                      |                        |
| Manganese                                    | 7439-96-5   | 0.001  | mg/L           | 0.263             | 0.276             | 0.106              | 0.030                | 0.053                  |
| Iron   | 7439-89-6   | 0.05   | mg/L           | 0.17              | <0.10             | 0.63               | 0.36                 | 0.54                   |
| EK040P: Fluoride by PC Titrator              |             |        |                |                   |                   |                    |                      |                        |
| Fluoride                                     | 16984-48-8  | 0.1    | mg/L           | 0.3               | 0.8               | 0.7                | 0.8                  | 0.6                    |



| Sub-Matrix: WATER<br>(Matrix: WATER)      |                 |        | Sample ID      | SWP1<br>Point 1   | SWC_2<br>Point 19 | SWC_UP<br>Point 20 | SWC_Down<br>Point 21 | SWC_DOWN_2<br>Point 22 |
|---|-----------------|--------|----------------|-------------------|-------------------|--------------------|----------------------|------------------------|
|   |                 | Sampli | ng date / time | 05-Sep-2023 09:35 | 05-Sep-2023 08:45 | 05-Sep-2023 07:50  | 05-Sep-2023 08:10    | 05-Sep-2023 08:20      |
| Compound                                  | CAS Number      | LOR    | Unit           | EW2303862-001     | EW2303862-002     | EW2303862-003      | EW2303862-004        | EW2303862-005          |
|   |                 |        |                | Result            | Result            | Result             | Result               | Result                 |
| EK040P: Fluoride by PC Titrator - Continu | ied             |        |                |                   |                   |                    |                      |                        |
| EK055G: Ammonia as N by Discrete Ana      | lyser           |        |                |                   |                   |                    |                      |                        |
| Ammonia as N                              | 7664-41-7       | 0.01   | mg/L           | 0.09              | 0.76              | 0.54               | 0.51                 | 0.25                   |
| EK055G-NH4: Ammonium as N by DA           |                 |        |                |                   |                   |                    |                      |                        |
| Ammonium as N                             | 14798-03-9_N    | 0.01   | mg/L           | 0.09              | 0.76              | 0.54               | 0.51                 | 0.25                   |
| EK057G: Nitrite as N by Discrete Analys   | er              |        |                |                   |                   |                    |                      |                        |
| Nitrite as N                              | 14797-65-0      | 0.01   | mg/L           | <0.01             | 0.02              | 0.02               | 0.01                 | 0.01                   |
| EK058G: Nitrate as N by Discrete Analys   | ser             |        |                |                   |                   |                    |                      |                        |
| Nitrate as N                              | 14797-55-8      | 0.01   | mg/L           | <0.01             | 0.06              | 0.09               | 0.06                 | 0.10                   |
| EK059G: Nitrite plus Nitrate as N (NOx)   | by Discrete Ana | lyser  |                |                   |                   |                    |                      |                        |
| Nitrite + Nitrate as N                    |                 | 0.01   | mg/L           | <0.01             | 0.08              | 0.11               | 0.07                 | 0.11                   |
| EN055: Ionic Balance                      |                 |        |                |                   |                   |                    |                      |                        |
| Ø Total Anions                            |                 | 0.01   | meq/L          | 10.9              | 321               | 255                | 360                  | 222                    |
| Ø Total Cations                           |                 | 0.01   | meq/L          | 11.0              | 339               | 288                | 394                  | 244                    |
| Ø Ionic Balance                           |                 | 0.01   | %              | 0.62              | 2.65              | 6.01               | 4.55                 | 4.80                   |
| EP005: Total Organic Carbon (TOC)         |                 |        |                |                   |                   |                    |                      |                        |
| Total Organic Carbon                      |                 | 1      | mg/L           | 20                | 8                 | 8                  | 6                    | 7                      |
| EP025FD: Field Dissolved Oxygen           |                 |        |                |                   |                   |                    |                      |                        |
| Dissolved Oxygen                          |                 | 0.01   | mg/L           | 4.16              | 4.91              | 5.02               | 5.37                 | 6.27                   |



| Sub-Matrix: WATER<br>(Matrix: WATER)         |             |        | Sample ID      | Duplicate         | <br> | <br> |
|--|-------------|--------|----------------|-------------------|------|------|
|  |             | Sampli | ng date / time | 05-Sep-2023 08:45 | <br> | <br> |
| Compound                                     | CAS Number  | LOR    | Unit           | EW2303862-006     | <br> | <br> |
|  |             |        |                | Result            | <br> | <br> |
| EA005FD: Field pH                            |             |        |                |                   |      |      |
| рН   |             | 0.1    | pH Unit        | 7.3               | <br> | <br> |
| EA010FD: Field Conductivity                  |             |        |                |                   |      |      |
| Electrical Conductivity (Non<br>Compensated) |             | 1      | μS/cm          | 26800             | <br> | <br> |
| EA015: Total Dissolved Solids dried at 1     | 80 ± 5 °C   |        |                |                   |      |      |
| Total Dissolved Solids @180°C                |             | 10     | mg/L           | 21500             | <br> | <br> |
| EA025: Total Suspended Solids dried at       | 104 ± 2°C   |        |                |                   |      |      |
| Suspended Solids (SS)                        |             | 5      | mg/L           | <5                | <br> | <br> |
| EA045: Turbidity                             |             |        |                |                   |      |      |
| Turbidity                                    |             | 0.1    | NTU            | 3.6               | <br> | <br> |
| EA116: Temperature                           |             |        |                |                   |      |      |
| Temperature                                  |             | 0.5    | °C             | 15.6              | <br> | <br> |
| ED037P: Alkalinity by PC Titrator            |             |        |                |                   |      |      |
| Hydroxide Alkalinity as CaCO3                | DMO-210-001 | 1      | mg/L           | <1                | <br> | <br> |
| Carbonate Alkalinity as CaCO3                | 3812-32-6   | 1      | mg/L           | <1                | <br> | <br> |
| Bicarbonate Alkalinity as CaCO3              | 71-52-3     | 1      | mg/L           | 163               | <br> | <br> |
| Total Alkalinity as CaCO3                    |             | 1      | mg/L           | 163               | <br> | <br> |
| ED041G: Sulfate (Turbidimetric) as SO4       | 2- by DA    |        |                |                   |      |      |
| Sulfate as SO4 - Turbidimetric               | 14808-79-8  | 1      | mg/L           | 1610              | <br> | <br> |
| ED045G: Chloride by Discrete Analyser        |             |        |                |                   |      |      |
| Chloride                                     | 16887-00-6  | 1      | mg/L           | 10100             | <br> | <br> |
| ED093F: Dissolved Major Cations              |             |        |                |                   |      |      |
| Calcium                                      | 7440-70-2   | 1      | mg/L           | 282               | <br> | <br> |
| Magnesium                                    | 7439-95-4   | 1      | mg/L           | 719               | <br> | <br> |
| Sodium                                       | 7440-23-5   | 1      | mg/L           | 5950              | <br> | <br> |
| Potassium                                    | 7440-09-7   | 1      | mg/L           | 218               | <br> | <br> |
| EG020F: Dissolved Metals by ICP-MS           |             |        |                |                   |      |      |
| Iron   | 7439-89-6   | 0.05   | mg/L           | <0.10             | <br> | <br> |
| EG020T: Total Metals by ICP-MS               |             |        |                |                   |      |      |
| Manganese                                    | 7439-96-5   | 0.001  | mg/L           | 0.042             | <br> | <br> |
| Iron   | 7439-89-6   | 0.05   | mg/L           | 0.43              | <br> | <br> |
| EK040P: Fluoride by PC Titrator              |             |        |                |                   |      |      |
| Fluoride                                     | 16984-48-8  | 0.1    | mg/L           | 0.7               | <br> | <br> |



| Sub-Matrix: WATER<br>(Matrix: WATER)     |                 |        | Sample ID      | Duplicate         | <br> | <br> |
|--|-----------------|--------|----------------|-------------------|------|------|
|  |                 | Sampli | ng date / time | 05-Sep-2023 08:45 | <br> | <br> |
| Compound                                 | CAS Number      | LOR    | Unit           | EW2303862-006     | <br> | <br> |
|  |                 |        |                | Result            | <br> | <br> |
| EK055G: Ammonia as N by Discrete Anal    | yser            |        |                |                   |      |      |
| Ammonia as N                             | 7664-41-7       | 0.01   | mg/L           | 0.76              | <br> | <br> |
| EK055G-NH4: Ammonium as N by DA          |                 |        |                |                   |      |      |
| Ammonium as N                            | 14798-03-9_N    | 0.01   | mg/L           | 0.76              | <br> | <br> |
| EK057G: Nitrite as N by Discrete Analyse | ər              |        |                |                   |      |      |
| Nitrite as N                             | 14797-65-0      | 0.01   | mg/L           | 0.02              | <br> | <br> |
| EK058G: Nitrate as N by Discrete Analys  | er              |        |                |                   |      |      |
| Nitrate as N                             | 14797-55-8      | 0.01   | mg/L           | 0.06              | <br> | <br> |
| EK059G: Nitrite plus Nitrate as N (NOx)  | by Discrete Ana | lyser  |                |                   |      |      |
| Nitrite + Nitrate as N                   |                 | 0.01   | mg/L           | 0.08              | <br> | <br> |
| EN055: Ionic Balance                     |                 |        |                |                   |      |      |
| Ø Total Anions                           |                 | 0.01   | meq/L          | 322               | <br> | <br> |
| Ø Total Cations                          |                 | 0.01   | meq/L          | 338               | <br> | <br> |
| ø lonic Balance                          |                 | 0.01   | %              | 2.42              | <br> | <br> |
| EP005: Total Organic Carbon (TOC)        |                 |        |                |                   |      |      |
| Total Organic Carbon                     |                 | 1      | mg/L           | 7                 | <br> | <br> |
| EP025FD: Field Dissolved Oxygen          |                 |        |                |                   |      |      |
| Dissolved Oxygen                         |                 | 0.01   | mg/L           | 4.91              | <br> | <br> |



#### Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) EA045: Turbidity (WATER) EP005: Total Organic Carbon (TOC) (WATER) EG020F: Dissolved Metals by ICP-MS (WATER) EG020T: Total Metals by ICP-MS (WATER) EK057G: Nitrite as N by Discrete Analyser (WATER) EK058G: Nitrate as N by Discrete Analyser (WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (WATER) EA025: Total Suspended Solids dried at 104 ± 2°C (WATER) EK055G-NH4: Ammonium as N by DA (WATER) EK055G: Ammonia as N by Discrete Analyser (WATER) EN055: Ionic Balance (WATER) ED045G: Chloride by Discrete Analyser (WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (WATER) EK040P: Fluoride by PC Titrator (WATER) ED037P: Alkalinity by PC Titrator (WATER) ED093F: Dissolved Major Cations (WATER) EA015: Total Dissolved Solids dried at 180 ± 5 °C



**Appendix F:** 

Laboratory Chain of Custody (COC) & Certificates of Analysis

(COA) – Dust Samples. Quarters 1-4

| (ALS)  | CHAIN OF CUSTODY<br>ALS Laboratory: please tick →  | El Sydney: 277 Woodpark<br>Ph: 02 8784 8555 Eisampi<br>El Newcastie: 5 Rosegum<br>Ph:02 4968 9433 Eisampie | Rd. Smithfield N<br>es.sydney@alsei<br>Rd. Warabrook<br>s.newcastle@al- | ISW 2176 Distance: 32 3<br>nvfro.som Ph:07 3243 7222 8<br>NSW 2304 Distance: 14<br>seriviro.com Ph:07 4796 0600 8 | Shand St, Staffo<br>Eisamptes brisbi<br>4~15 Desma Ct,<br>Ei townsville enviro | ord QLD 4053<br>ane@alsenviro<br>Bohle QLD 481<br>ximenial@elsenvi | com Ph:0<br>8 Cl<br>Io.com Ph:  | Melbo<br>03 854<br>Adela<br>08 83 | ume: 2×4 W<br>9-9600 E. sa<br>ide: 2-1 Bun<br>59 0890 E:a | /estall Rd,<br>amples.me<br>ma Rd, Po<br>delaide@ <i>c</i> | Springvale<br>Ibourne@a<br>ioraka SA 5<br>ilsenviro.co | VIC 3171<br>Isonviro.com<br>095<br>m | <ul> <li>Perth: 10</li> <li>Ph: 08 9209</li> <li>Caunces</li> <li>Ph: 03 633</li> </ul> | ) Hod Way, Malaç<br>17655 E: samples<br>ton: 27 Wellingto<br>1 2158 E: launces | ga WA 6090<br>s.perth@alser<br>on St, Launces<br>ston@alsenwr | iViro.xem<br>ston TAS 7250<br>6.com  |
|--|--|--|---|---|--|--|---------------------------------|-----------------------------------|---|--|--|--------------------------------------|---|--|---|--|
| CLIENT:  | Shellharbour City Council  | ······   | TURNARO   | UND REQUIREMENTS :  | Standa   | ard TAT (List  | due date):                      |                                   |   |  |  |                                      | FO  | R LABORATO   | DRY USE C   | INLY (Circle)  |
| OFFICE:  | Dunmore  | ÷.   | (Standard TAT   | may be longer for some tests  | Non Si   | tandard or urg   | gent TAT (Lis                   | t due                             | date):  |  |  |                                      | Cas   | tody Seal Intacti  | 2 1 1 1   | Yes No N   |
| PROJECT:   | Dunmore Dust   |  | ALS QUOT  | E NO.: WO/030/19 TEND   | ER   |  |                                 |                                   | co  | C SEQUE  |  | IBER (Circ                           | ie) Fre   | s ice i frozen loe<br>offi   | bricks prese  | ntupon .<br>Yes No N   |
| ORDER NUMBER:  | and from the second second second second second second second second second second second second second second | ,  |   |   |  |  |                                 |                                   | coc: 1  | 2  | 34   | 5                                    | 6 7 Rar   | dom Sample Te  | mperature or  | Recept. C  |
| PROJECT MANAGER:                                       | Joel Culton  |  |   |   |  |  |                                 |                                   | OF: 1   | 2  | 34   | 5                                    | 6 7 Omb   | er comment:  | 18  |  |
| SAMPLER:   | shart Dok  | SAMPLER N  | OBILE:  |   | RELINQUIS  | SHED BY:   |                                 |                                   | RECEIVE   | D BY:  | *  |                                      | RELINQ  | JISHED BY:   |   | RECEIVED BY:   |
| COC emailed to ALS?                                    | (YES / NO)   | EDD FORM   | AT (or defaul   | t):   | 125  | er l   | Dahm                            | 0                                 |   |  |  |                                      |   |  |   |  |
| Email Reports to :                                     |  |  |   |   |  | Ξ:   |                                 |                                   | DATE/TIN  | IE:  |  |                                      | DATE/TI   | AE:  |   | DATE/TIME:   |
| Email Invoice to :                                     |  |  |   |   | i/12-  | 125  |                                 |                                   |   |  |  |                                      |   |  |   |  |
| COMMENTS/SPECIAL                                       | HANDLING/STORAGE OR DISPOS   | AL: CC reports to  |   |   |  |  |                                 |                                   |   |  |  | <b>.</b>                             | F   |  |   |  |
| ALS USE ONLY   | SAMPL<br>MATRIX: So  | E DETAILS<br>olid(S) Water(W)  |   | CONTAINER INF   | ORMATION   |  | ANALYSI<br>Where M              | IS RE                             | QUIRED i  | includin<br>specify Tota                                   | g SUITES   | <b>S</b> (NB. Suite bottle required  | Codes must be<br>) or Dissolved (fi   | listed to attract s<br>ald filtered bottle re                                  | suite price)<br>squired).                                     | Additional Information   |
| LAB ID   | SAMPLE ID  | DATE / TIME  | MATRIX  | TYPE & PRESERVAT<br>(refer to codes below   | <b>'IVE</b><br>#)  | TOTAL<br>BOTTLES   | A04 (Ash, CM, TIS)              |                                   |   |  |  |                                      |   | , k  |   | Comments on likely contaminant levels,<br>dilutions, or samples requiring specific QC<br>analysis etc. |
|  | DDG1 1/  | 12122 9:25   | AIR   |   |  |  | 1                               |                                   |   |  |  |                                      |   |  |   |  |
|  | DDG2   | 941  | AIR   |   |  |  | 1                               |                                   |   |  |  |                                      |   |  |   | 1  |
|  | DDG3   | 8:4  | AIR   |   |  |  | 1                               |                                   |   |  |  | E                                    | nvironm   | ental Div  | ision   | · · ·  |
|  | DDG4   | + 8:32   | AIR   |   |  |  | 1                               |                                   |   |  |  | ∨                                    | Vollongo<br>Work Or<br>EW   | ng<br>der Refere<br>2205   | <sup>nœ</sup><br>528  |  |
|  |  |  |   |   |  |  |                                 |                                   |   |  |  |                                      |   |  |   |  |
|  |  |  |   |   |  |  |                                 |                                   |   |  |  |                                      | Telephone :   | 02 42253125  | <u> </u>  |  |
| Water Container Codes: 1<br>V = VOA Vial HCI Preserver | P = Unpreserved Plastic; N = Nitric Preserv<br>d; VB = VOA Vial Sodium Bisulphate Preserv                      | red Plastic; ORC = Nitric Preserved<br>ved; VS = VOA Vial Sulfuric Preser                                  | IORC; SH = Si<br>ved; AV = Airfre                                       | odium Hydroxide/Cd Preserved;<br>ight Unpreserved Vial SG = Sulf  | S = Sodium Hy<br>furic Preserved   | 10<br>droxide Preser<br>Amber Glass;                               | ved Plastic; A0<br>H = HCI pres | G = Ar<br>servec                  | nber Glass<br>Plastic; Hi                                 | Unpreser<br>S = HCl p                                      | ved; AP - A<br>reserved S                              | Virfreight Unp<br>peciation bot      | reserved Plasti<br>tle; SP = Sulfuri  | c<br>Preserved Pla   | stic; F = For   | maldehyde Preserved Glass;   |

,



## **CERTIFICATE OF ANALYSIS**

| Work Order              | EW2205528                                     | Page                    | : 1 of 3   |
|-------------------------|---|-------------------------|--|
| Client                  | SHELLHARBOUR CITY COUNCIL                     | Laboratory              | Environmental Division NSW South Coast   |
| Contact                 | : Ryan Stirling                               | Contact                 | : Aneta Prosaroski   |
| Address                 | : LAMERTON HOUSE, LAMERTON CRESCENT           | Address                 | : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia   |
|                         | SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529 |                         |  |
| Telephone               | :   | Telephone               | : +61 2 4225 3125  |
| Project                 | : Dunmore Landfill Dust                       | Date Samples Received   | : 01-Dec-2022 13:00  |
| Order number            | : 147649                                      | Date Analysis Commenced | : 02-Dec-2022  |
| C-O-C number            | :   | Issue Date              | : 12-Dec-2022 18:08  |
| Sampler                 | : Robert DaLio                                |                         | HALA NALA  |
| Site                    | : DUNMORE LANDFILL TENDER                     |                         |  |
| Quote number            | : WO/030/19 TENDER DUST                       |                         | The Annual Annua |
| No. of samples received | : 4   |                         | Accredited for compliance with   |
| No. of samples analysed | : 4   |                         | ISO/IEC 17025 - Testing  |

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

#### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| Signatories        | Position            | Accreditation Category                     |
|--------------------|---------------------|--|
| Zoran Grozdanovski | Laboratory Operator | Newcastle - Inorganics, Mayfield West, NSW |



#### **General Comments**

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

• Analytical work for this work order will be conducted at ALS Newcastle.

- Analysis as per AS3580.10.1-2016. Samples passed through a 1mm sieve prior to analysis. NATA accreditation does not apply for results reported in g/m<sup>2</sup>.mth.
- Sample exposure period is 27 days which is outside the typical exposure period of 30 +/- 2 days as per AS3580.10.1.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/66.1 Sampling and Siting of Dust Depositon Gauges.
- For dust analysis, the Limit of Reporting (LOR) referenced in the reports for deposited matter parameters represents the reporting increment rather than reporting limit.

| Sub-Matrix: DEPOSITIONAL DUST<br>(Matrix: AIR) |            |        | Sample ID      | DDG1<br>04/11/2022 -<br>01/12/2022 | DDG2<br>04/11/2022 -<br>01/12/2022 | DDG3<br>04/11/2022 -<br>01/12/2022 | DDG4<br>04/11/2022 -<br>01/12/2022 |  |
|--|------------|--------|----------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|--|
|  |            | Sampli | ng date / time | 01-Dec-2022 00:00                  | 01-Dec-2022 00:00                  | 01-Dec-2022 00:00                  | 01-Dec-2022 00:00                  |  |
| Compound                                       | CAS Number | LOR    | Unit           | EW2205528-001                      | EW2205528-002                      | EW2205528-003                      | EW2205528-004                      |  |
|  |            |        |                | Result                             | Result                             | Result                             | Result                             |  |
| EA120: Ash Content                             |            |        |                |                                    |                                    |                                    |                                    |  |
| Ash Content                                    |            | 0.1    | g/m².month     | 0.8                                | 0.6                                | 1.0                                | 1.3                                |  |
| Ash Content (mg)                               |            | 2      | mg             | 12                                 | 9                                  | 16                                 | 20                                 |  |
| EA125: Combustible Matter                      |            |        |                |                                    |                                    |                                    |                                    |  |
| Combustible Matter                             |            | 0.1    | g/m².month     | 0.4                                | 0.2                                | 0.7                                | 0.8                                |  |
| Combustible Matter (mg)                        |            | 2      | mg             | 7                                  | 4                                  | 11                                 | 13                                 |  |
| EA141: Total Insoluble Matter                  |            |        |                |                                    |                                    |                                    |                                    |  |
| Total Insoluble Matter                         |            | 0.1    | g/m².month     | 1.2                                | 0.8                                | 1.7                                | 2.1                                |  |
| Total Insoluble Matter (mg)                    |            | 2      | mg             | 19                                 | 13                                 | 27                                 | 33                                 |  |



### Inter-Laboratory Testing

Analysis conducted by ALS Newcastle, NATA accreditation no. 825, site no. 1656 (Chemistry) 9854 (Biology).

(AIR) EA125: Combustible Matter

(AIR) EA120: Ash Content

(AIR) EA141: Total Insoluble Matter

# CHAIN OF CUSTODY

#### Sydney: 277 Woodpark Rd, Smithfield NSW 2176 Ph: 02 8784 8555 E samples sydney@alsenviro.com ALS Laboratory: please tick →

Brisbane, 32 Shand St. Stafford QLD 4053 Ph:07 3243 7222 E:samples brisbarie@alseriviro.com New castle: 5 Rosogum RV. Warstrock NSW 230
 Newcastle: 5 Rosogum RV. Warstrock NSW 230
 New castle: 14-15 Cesma Ct. Bolke QLD 4818
 1 Melhourne 2-4 Westall Rd. Springvale VIC 3171 Ph.03 8549 9600 E. samples nielbourne@alsenviro.com C Adelaide: 2-1 Burma Rd. Popraka SA 5095 Ph 08 8359 0890 E.adelaide@alsenviro.com

C) Perth: 10 Hog Way, Malaga WA 6090 Ph: 08 9209 7655 E: samples perth@alsenviro.com C Launceston: 27 Wellington St. Launceston TAS 7250 Phr 03 6331 2158 E: Jaunceston@alsonviro.com

| stirling<br>J D Calaion<br>I NO)<br>LING/STORAGE OR DISPOSAL<br>SAMPLE<br>MATRIX: Solid | SAMPLER M<br>EDD FORMA<br>: CC reports to:<br>DETAILS<br>((S) Water(W)  | (Standard TAT<br>e.g. Ultra Trac<br>ALS QUOTI<br>OBILE:<br>T (or default  | may be longer for some tests  e Organics) E NO.: WO/030/19 TENDER RELIN ): DATE   | IQUISHED BY:<br>Joent To<br>Jointe:<br>3.23  | ) to the second se | due date):<br>COC SEQUENCE NUMBER (Ci<br>coc: 1 2 3 4 5<br>oF: 1 2 3 4 5<br>RECEIVED BY:<br>DATE/TIME:<br>2/3/2 3  | Cristody Seal Inract?<br>ircle) Free Jos / frozon ko brids pre-<br>récept?<br>6 7 Random Sample Temperature<br>6 7 Other comment<br>RELINQUISHED BY:<br>DATE/TIME:  | Yes No Santupon Yes No Santupon Yes No Santupon Second Constraints of the second constraints of |
|---|---|---|---|--|--|--|---|---|
| Stirling<br>J D D i D<br>I NO)<br>LING/STORAGE OR DISPOSAL<br>SAMPLE<br>MATRIX: Solid   | SAMPLER M<br>EDD FORMA<br>: CC reports to:<br>DETAILS<br>(S) Water(W)   | ALS QUOTI   | RELIN<br>):<br>DATE   | IQUISHED BY:<br>Shert To<br>TIME:<br>3.23  | )ed ; o  | COC SEQUENCE NUMBER (Ci<br>coc: 1 2 3 4 5<br>op: 1 2 3 4 5<br>RECEIVED BY:<br>DATEITIME:<br>2/3/23   | ircle) Free ise / forzan ice bricks pre<br>recept?<br>6 7 Random San ple Temperature<br>6 7 Other comment<br>RELINQUISHED BY:<br>DATE/TIME:   | RECEIVED BY:  |
| Stirling<br>J D CL :<br>I NO)<br>LING/STORAGE OR DISPOSAL<br>SAMPLE<br>MATRIX: Solid    | SAMPLER M<br>EDD FORMA<br>: CC reports to:<br>DETAILS<br>((S) Water(W)  | OBILE:<br>T (or default   | ):<br>DATE  | iquished by:<br>Joent To<br>Mime:<br>3.23  | )et ;o   | coc:       1       2       3       4       5         or:       1       2       3       4       5         RECEIVED BY:       -       -       -       -       -         DATETTIME:       2/3/23       3/23       -       -       - | 6 7 Rancom Sample Temperature<br>6 7 Other comment<br>RELINQUISHED BY:<br>DATE/TIME:  | RECEIVED BY:  |
| Stirling<br>+ [2 aLio]<br>I NO)<br>LING/STORAGE OR DISPOSAL<br>SAMPLE<br>MATRIX: Solid  | SAMPLER M<br>EDD FORMA<br>: CC reports to:<br>DETAILS<br>(S) Water(W)   | OBILE:<br>T (or default   | ):<br>Date  | iquished by:<br>Shert 5<br>TIME:<br>3.23   | )et ; o  | of: 1 2 3 4 5<br>RECEIVED BY:<br>DATE/TIME:<br>2/3/23  | 6 7 Other continent. RELINQUISHED BY: DATE/TIME:  | RECEIVED BY:<br>DATE/TIME:  |
| ING/STORAGE OR DISPOSAL   | SAMPLER M<br>EDD FORMA<br>: CC reports to:<br>DETAILS<br>((S) Water(W)  | OBILE:<br>T (or default   | ):<br>Date  | IQUISHED BY:<br>Joent C<br>MIME:<br>3.23   | )et;o  | DATE/TIME:<br>2/3/23   | RELINQUISHED BY:<br>DATE/TIME:  | RECEIVED BY:<br>DATE/TIME:  |
| T IZ GELE<br>I NO)<br>LING/STORAGE OR DISPOSAL<br>SAMPLE<br>MATRIX: Solid               | EDD FORMA<br>CC reports to:<br>DETAILS<br>((S) Water(W)   | T (or default   | ):<br>DATE  | $3 \cdot 2 \cdot 3$  | )et;o  | DATESTIME:<br>2/3/23   | DATE/TIME:  | DATE/TIME:  |
| LING/STORAGE OR DISPOSAL<br>SAMPLE<br>MATRIX: Solid                                     | : CC reports to:<br>DETAILS<br>(S) Water(W)   |   | DATE  | /TIME:<br><u>3 ·2−3</u>  | -  | 2/3/23   | DATE/TIME:  | DATE/TIME:  |
| LING/STORAGE OR DISPOSAL<br>SAMPLE<br>MATRIX: Solid                                     | : CC reports to:<br>DETAILS<br>(S) Water(W)   |   | ,   | 3.23   |  | 2/3/25   |   |   |
| LING/STORAGE OR DISPOSAL<br>SAMPLE<br>MATRIX: Solid                                     | CC reports to:<br>DETAILS<br>(S) Water(W)   |   |   |  |  | r  |   |   |
| SAMPLE<br>MATRIX: Solid   | DETAILS<br>I(S) Water(W)  |   |   |  |  |  |   |   |
|   | (S) water(w)  |   | CONTAINER INFORMA   | TION   | ANALYSIS   | REQUIRED including SUITES (NB. Sui   | ite Codes must be listed to attract suite price   | ) Additional Information  |
|   |   |   | <u> </u>  |  | Where Ma   | tals are required, specify Total (unfiltered bottle requi  | Ired) of Dissolved (read lingred bottle required).  | Comments on likely contaminant levels,  |
|   |   |   |   |  |  |  |   | dilutions, or samples requiring specific QC analysis etc.   |
| SAMPLE ID   | DATE / TIME   | MATRIX  | TYPE & PRESERVATIVE<br>(refer to codes below)   | TOTAL<br>BOTTLES   | , CM, TIS)   |  |   |   |
| :   |   |   |   |  | A04 (Ash   |  |   |   |
| 1   | 1.323 9:15  | AIR   |   |  | 1  |  |   |   |
| j2  | , 2:53  | Ş AIR   |   |  | 1  |  |   |   |
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| <u>4</u>  | I GIE   | AIR   |   |  | -  |  | Environmental Dir<br>Wollongong   | vision  |
|   | <u> </u>  | 1   |   |  |  |  | Work Order Refere<br>F\\/2200   |   |
|   |   |   |   |  |  |  | LVV2000   | <u> </u>  |
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|   |   | +   |   |  |  |  |   | ξ <b>.</b>  |
|   |   |   |   |  |  |  | MANTIN NI WATER A STATE   |   |
|   |   |   |   |  | <u> </u>   |  | Telephone : 02 42253125   | <u> </u>  |
| -   | 97 YEE DO YOO DO YOO DO YOO DO YOO DO YOO DO YOO DO YOO DO YOO DO YOO DO YOO DO YOO DO YOO DO YOO DO YOO DO YOO |   |   |  |  |  |   |   |
|   |   |   |   | тота. 10   |  |  |   |   |
|   | SAMPLE ID   | SAMPLE ID         DATE / TIME           1         1.3.23         9.15           2         8.35         9.25           3         9.25         9.15           4         9.15         9.15           4         9.15         9.15           9         9.25         9.15           9         9.15         9.15           9         9.15         9.15           9         9.25         9.15           9         9.15         9.15           9         9.25         9.15           9         9.25         9.15           9         9.25         9.15           9         9.25         9.15           9         9.25         9.15           9         9.25         9.15           9         9.25         9.15           9         9.25         9.15           9         9.15         9.15           9         9.15         9.15           9         9.15         9.15           9         9.15         9.15           9         9.15         9.15           9         9.15         9.15 | SAMPLE ID     DATE / TIME     MATRIX       1     1.3.2.3     9.15     AIR       2     8.55     AIR       3     9.25     AIR       14     9.15     AIR | SAMPLE ID         DATE / TIME         MATRIX         TYPE & PRESERVATIVE<br>(refer to codes below)           1         1.3.2.3         Q <sup>2</sup> .1.5         AIR           2         Q <sup>2</sup> .555         AIR           3         Q <sup>2</sup> .1.5         AIR           4         Q <sup>2</sup> .1.5         AIR | SAMPLE ID     DATE / TIME     MATRIX     TYPE & PRESERVATIVE<br>(refer to codes below)     TOTAL<br>BOTTLES       1     1.3.2.3     Q <sup>2</sup> .1.5     AIR       2     Q <sup>2</sup> .2.5     AIR       3     Q <sup>2</sup> .2.5     AIR       4     Q <sup>2</sup> .1.5     AIR       4     Q <sup>2</sup> .1.5     AIR       5     AIR     AIR       6     AIR     AIR       1     1.5.2.3     AIR       3     Q <sup>2</sup> .2.5     AIR       4     Q <sup>2</sup> .1.5     AIR       4     Q <sup>2</sup> .1.5     AIR       4     Q <sup>2</sup> .1.5     AIR       10     AIR     AIR   | SAMPLE ID         DATE / TIME         MATRIX         TYPE & PRESERVATIVE<br>(refer to codes below)         TOTAL<br>BOTTLES         ST<br>ST<br>ST<br>ST<br>ST<br>ST<br>ST<br>ST<br>ST<br>ST<br>ST<br>ST<br>ST<br>S              | SAMPLE ID         DATE / TIME         MATRIX         TYPE & PRESERVATIVE<br>(refer to codes below)         TOTAL<br>BOTTLES         Soft<br>Soft           1         1.3.2.3         Q <sup>2</sup> / <sub>2</sub> / <sub>2</sub> AIR         -         < | SAMPLE ID     DATE / TIME     MATRIX     TYPE & PRESERVATIVE<br>(refer to codes below)     TOTAL<br>BOTTLES     SP<br>Environmental Division       1     1.3.2.3     G'.I.S. AIR     -     -     -       2     Q'.S.S. AIR     -     -     -     -       3     G'.J.S. AIR     -     -     -     -       4     Y.S.S. AIR     -     -     -     -       4     Y.S.S. AIR     -     -     -     -       3     G'.J.S. AIR     -     -     -     -       4     Y.G'.J.S. AIR     -     -     -     -       -     -     -     -     -     -     -       -     -     -     -     -     -     -       -     -     -     -     -     -     -       -     -     -     -     -     -     -       -     -     -     -     -     -     -     -       -     -     -     -     -     -     -     -       -     -     -     -     -     -     -     -       -     -     -     -     -     -     -     -  |



## **CERTIFICATE OF ANALYSIS**

| Work Order              | EW2300845                                     | Page                    | : 1 of 3   |
|-------------------------|---|-------------------------|--|
| Client                  | : SHELLHARBOUR CITY COUNCIL                   | Laboratory              | : Environmental Division NSW South Coast                   |
| Contact                 | : Ryan Stirling                               | Contact                 | : Aneta Prosaroski   |
| Address                 | LAMERTON HOUSE, LAMERTON CRESCENT             | Address                 | : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia |
|                         | SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529 |                         |  |
| Telephone               | :   | Telephone               | : +61 2 4225 3125  |
| Project                 | : Dunmore Landfill Dust                       | Date Samples Received   | : 02-Mar-2023 10:42  |
| Order number            | : 147649                                      | Date Analysis Commenced | : 06-Mar-2023  |
| C-O-C number            | :   | Issue Date              | : 13-Mar-2023 13:29  |
| Sampler                 | : Robert DaLio                                |                         | HALA NALA  |
| Site                    | : DUNMORE LANDFILL TENDER                     |                         |  |
| Quote number            | : WO/030/19 TENDER DUST                       |                         | Accorditation No. 935                                      |
| No. of samples received | : 4   |                         | Accredited for compliance with                             |
| No. of samples analysed | : 4   |                         | ISO/IEC 17025 - Testing                                    |

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

#### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| Signatories        | Position            | Accreditation Category                     |
|--------------------|---------------------|--|
| Zoran Grozdanovski | Laboratory Operator | Newcastle - Inorganics, Mayfield West, NSW |


#### **General Comments**

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

• Dust analysis conducted by ALS Newcastle, NATA accreditation no. 825, site no. 1656.

- Analysis as per AS3580.10.1-2016. Samples passed through a 1mm sieve prior to analysis. NATA accreditation does not apply for results reported in g/m<sup>2</sup>.mth as sampling data was provided by the client.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/66.1 Sampling and Siting of Dust Depositon Gauges.
- The dust gauges for all samples were full when received by the laboratory. They may have overflowed in the field. Results for these gauges are thus reported on an 'as received' basis.
- For dust analysis, the Limit of Reporting (LOR) referenced in the reports for deposited matter parameters represents the reporting increment rather than reporting limit.

| Sub-Matrix: DEPOSITIONAL DUST<br>(Matrix: AIR) |            |        | Sample ID      | DDG1<br>01/02/2023 -<br>01/03/2023 | DDG2<br>01/02/2023 -<br>01/03/2023 | DDG3<br>01/02/2023 -<br>01/03/2023 | DDG4<br>01/02/2023 -<br>01/03/2023 |  |
|--|------------|--------|----------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|--|
|  |            | Sampli | ng date / time | 01-Mar-2023 09:15                  | 01-Mar-2023 08:55                  | 01-Mar-2023 09:25                  | 01-Mar-2023 09:15                  |  |
| Compound                                       | CAS Number | LOR    | Unit           | EW2300845-001                      | EW2300845-002                      | EW2300845-003                      | EW2300845-004                      |  |
|  |            |        |                | Result                             | Result                             | Result                             | Result                             |  |
| EA120: Ash Content                             |            |        |                |                                    |                                    |                                    |                                    |  |
| Ash Content                                    |            | 0.1    | g/m².month     | 0.9                                | 0.3                                | 0.7                                | 1.9                                |  |
| Ash Content (mg)                               |            | 2      | mg             | 15                                 | 5                                  | 12                                 | 31                                 |  |
| EA125: Combustible Matter                      |            |        |                |                                    |                                    |                                    |                                    |  |
| Combustible Matter                             |            | 0.1    | g/m².month     | 0.6                                | 0.5                                | 0.8                                | 0.5                                |  |
| Combustible Matter (mg)                        |            | 2      | mg             | 9                                  | 8                                  | 12                                 | 9                                  |  |
| EA141: Total Insoluble Matter                  |            |        |                |                                    |                                    |                                    |                                    |  |
| Total Insoluble Matter                         |            | 0.1    | g/m².month     | 1.5                                | 0.8                                | 1.5                                | 2.4                                |  |
| Total Insoluble Matter (mg)                    |            | 2      | mg             | 24                                 | 13                                 | 24                                 | 40                                 |  |



#### Inter-Laboratory Testing

Analysis conducted by ALS Newcastle, NATA accreditation no. 825, site no. 1656 (Chemistry) 9854 (Biology).

(AIR) EA125: Combustible Matter

(AIR) EA120: Ash Content

(AIR) EA141: Total Insoluble Matter

| · .                   |
|-----------------------|
|                       |
|                       |
| - <b>C</b> . <b>N</b> |
| (ALS)                 |

#### CHAIN OF CUSTODY La Sydney: 277 Woodpark Rd, Smithlield NSW 2176 Ph: 02 8784 8555 E;samples.sydney@alsenviro.com

ALS Laboratory: please tick →

 Ph: 02 8784 8555 E.samples.sydnøy@alsenviro.com
 Ph:07 3243 7223

 □ Newcastle: 5 Rosegum Rd, Warabroek NSW 2304
 □ Townsville:

 Ph:02 4968 9433 E.samples.newcastle@alsenviro.com
 Ph:07 4796 0600

Brisbane: 32 Shand St. Stafford QLD 4053
 Pht07 3243 7222 E samples brisbane@alsenviro.com
 Townsville: 14-15 Desma Ct. Bohle QLD 4818
 Pht07 4786 0606 E : tow-salle amronment#@alsenviro.com

Melbourne: 2-4 Westall Rd. Springvala ViC 317.1
Ph.03.8549.9600 E: samples melbourna@alsernitro.com
 Adelaide: 2-1 Burna Rd. Porotaka SA 5095
Ph: 08.8550.0800 E:ndelaide@alsernitro.com

.

El Perth: 10 Hod Way, Malaga WA 6090 Ph. 08 9209 7653 El samples parti@alisenviro.com El Launceston: 27 Wellington St, Launceston TAS 7250 Ph. 03 6331 2158 El saunceston@alisenviro.com

| CLIENT:            | Shellharbour City Council | TURNAROUND REQUIREMENT  | S: 🛛 Standard TAT (List due date): | List due date): FO                          |        |     |     |   |       |        |      | FOR LABORATORY USE ONLY (Circle) |                      |            |      | 2     |
|--------------------|---------------------------|---|------------------------------------|---|--------|-----|-----|---|-------|--------|------|----------------------------------|----------------------|------------|------|-------|
| OFFICE:            | Dunmore                   | (Standard TAT may be longer for some<br>e.g., Ultra Trace Organics) | Non Standard or urgent TAT (List d | Non Standard or urgent TAT (List due date): |        |     |     |   |       |        |      |                                  | #                    | Yes        | No q | (De   |
| PROJECT:           | Dunmore Dust              | ALS QUOTE NO .: WO/030/19   | TENDER                             |   |        |     |     |   | ER (C | ircle) |      | Free ice / mozen ic<br>receipt?  | xe oricks present up | on yes     | No   | MA    |
| ORDER NUMBER:      |                           |   |                                    | COC:  | 1      | 2   | 3   | 4 | 5     | 6      | 7    | Rendom Semple T                  | Cemperature on Red   | ceipt:     | .c   | attr. |
| PROJECT MANAGER    | Ryan Stirling             |   |                                    | OF:   | .1     | 2   | 3   | 4 | 5     | 6      | 7    | Other comment.                   |                      |            |      |       |
| SAMPLER: Micha     | el Santos                 | SAMPLER MOBILE: 0403 590 899  | RELINQUISHED BY:                   | RECE  | EIVED  | BY: |     |   |       |        | RELI | INQUISHED BY:                    |                      | RECEIVED B | Y:   |       |
| COC emailed to ALS | ?(YES / NO)               | EDD FORMAT (or default):  | Michael Santas                     |   | h      | eta |     |   |       |        |      |                                  |                      |            |      |       |
| Email Reports to : |                           |   | DATE/TIME:                         | DAŤE  | Ë/TIME |     |     | ~ |       |        | DATI | E/TIME:                          |                      | DATE/TIME: |      |       |
| Email Invoice to : |                           |   | 27.9.23 17:00                      | 2   | 앢      | 7   | l'l | 3 |       |        |      |                                  |                      | ·          |      |       |
|                    |                           |   |                                    |   | 1      |     | r   |   |       |        |      |                                  |                      |            |      |       |

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: CC reports to:

| ALS USE ONLY  | SAMPL<br>MATRIX: So  | E DETAILS<br>Ilid(S) Water(W)   |                                | CONTAINER INFORMATION  | CONTAINER INFORMATION ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price)<br>Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required). |                    |                     |            |                 | Additional Information |                     |              |                |  |
|---|--|---|--------------------------------|--|--|--------------------|---------------------|------------|-----------------|------------------------|---------------------|--------------|----------------|--|
| LAB ID  | SAMPLE ID  | DATE / TIME   | MATRIX                         | TYPE & PRESERVATIVE<br>(refer to codes below)                                      | TOTAL<br>BOTTLES   | A04 (Ash, CM, TIS) |                     |            |                 |                        |                     | 12           |                | Comments on likely contaminant levels.<br>dilutions, or samples requiring specific QC<br>analysis etc. |
|   | DDG1   | 27.9.23 10:18   | AIR                            |  |  | 1                  |                     |            |                 |                        |                     |              |                |  |
|   | DDG2   | 0:0   | AIR                            |  |  | 1                  |                     |            |                 | E<br>14                | nviron :<br>/ollong | nental I     | Divisio        | ]  |
|   | DDG3   |   | AIR                            |  |  | 1                  |                     |            |                 |                        |                     |              |                | · · · · · · · · · · · · · · · · · · ·  |
|   | DDG4   | 10:30   | AIR                            |  |  | 1                  |                     |            |                 |                        | EVV                 | 230          | 385            | 8  |
|   |  |   |                                |  |  |                    |                     |            |                 | τei                    | ephone : 0;         | 42253125     |                |  |
|   |  |   |                                |  |  |                    |                     |            |                 |                        |                     |              |                |  |
|   | Des Unexpression Displice Max Miles Press  | ed Blocks, OPC = Nitro Press  | d OPC: SH                      | TOTAL  | 10   | rved Plastic       | AG = Amber Glass    | Innreserv  | ved: AP - Airfi | reight Unpres          | erved Plastic       |              |                |  |
| V = VOA Vial HCI Preserve<br>Z = Zinc Acetate Preserved | H = Unpreserved Plastic; N = Nitric Preser<br>d; VB = VOA Vial Sodium Bisulphate Preserved Bottles; ST = 3 | ved mastic; UKC = Minc Preserve<br>rved; VS = VOA Vial Sulfuric Prese<br>Sterile Bottle; ASS = Plastic Bag fo | rved; AV = Ai<br>r Acid Sulpha | freight Unpreserved Vial SG = Sulfuric Preserved<br>te Soils; B = Unpreserved Bag. | Amber Glass  | ; H = HCl pr       | eserved Plastic; HS | S ≃ HCl pr | reserved Spe    | ciation bottle;        | SP = Sulfuric       | Preserved Pl | astic; F = For | maldehyde Preserved Glass;   |



## **CERTIFICATE OF ANALYSIS**

| Work Order              | EW2303858                                     | Page                    | : 1 of 3   |
|-------------------------|---|-------------------------|--|
| Client                  | SHELLHARBOUR CITY COUNCIL                     | Laboratory              | Environmental Division NSW South Coast                     |
| Contact                 | : Ryan Stirling                               | Contact                 | : Aneta Prosaroski   |
| Address                 | : LAMERTON HOUSE, LAMERTON CRESCENT           | Address                 | : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia |
|                         | SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529 |                         |  |
| Telephone               | :   | Telephone               | : +61 2 4225 3125  |
| Project                 | : Dunmore Landfill Dust                       | Date Samples Received   | : 27-Sep-2023 15:31  |
| Order number            | : 156810                                      | Date Analysis Commenced | : 29-Sep-2023  |
| C-O-C number            | :   | Issue Date              | 09-Oct-2023 16:06  |
| Sampler                 | : Michael Santos, Robert DaLio                |                         | Hac-MRA NATA   |
| Site                    | : DUNMORE LANDFILL TENDER                     |                         |  |
| Quote number            | : WO/030/19 TENDER DUST                       |                         | According to Bac   |
| No. of samples received | : 4   |                         | Accreditation No. 825<br>Accredited for compliance with    |
| No. of samples analysed | : 4   |                         | ISO/IEC 17025 - Testing                                    |

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

#### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| Signatories  | Position              | Accreditation Category                     |
|--------------|-----------------------|--|
| Thomas Regan | Laboratory Technician | Newcastle - Inorganics, Mayfield West, NSW |



#### **General Comments**

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

• Dust analysis conducted by ALS Newcastle, NATA accreditation no. 825, site no. 1656.

- Analysis as per AS3580.10.1-2016. Samples passed through a 1mm sieve prior to analysis. NATA accreditation is not held for results reported in g/m<sup>2</sup>.mth.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/66.1 Sampling and Siting of Dust Depositon Gauges.
- Sample exposure period is 26 days which is outside the typical exposure period of 30 +/- 2 days as per AS3580.10.1.
- For dust analysis, the Limit of Reporting (LOR) referenced in the reports for deposited matter parameters represents the reporting increment rather than reporting limit.

| Sub-Matrix: DEPOSITIONAL DUST<br>(Matrix: AIR) |            | Sampli | Sample ID  | DDG1<br>01/09/2023 -<br>27/09/2023<br>27-Sep-2023 10:18 | DDG2<br>01/09/2023 -<br>27/09/2023<br>27-Sep-2023 10:10 | DDG3<br>01/09/2023 -<br>27/09/2023<br>27-Sep-2023 11:10 | DDG4<br>01/09/2023 -<br>27/09/2023<br>27-Sep-2023 10:30 |  |
|--|------------|--------|------------|---|---|---|---|--|
| Compound                                       | CAS Number | LOR    | Unit       | EW2303858-001   | EW2303858-002   | EW2303858-003   | EW2303858-004   |  |
|  |            |        |            | Result  | Result  | Result  | Result  |  |
| EA120: Ash Content                             |            |        |            |   |   |   |   |  |
| Ash Content                                    |            | 0.1    | g/m².month | 0.4   | 0.5   | 0.8   | 6.5   |  |
| Ash Content (mg)                               |            | 2      | mg         | 6   | 9   | 14  | 103   |  |
| EA125: Combustible Matter                      |            |        |            |   |   |   |   |  |
| Combustible Matter                             |            | 0.1    | g/m².month | 0.3   | 1.0   | 0.4   | 3.0   |  |
| Combustible Matter (mg)                        |            | 2      | mg         | 6   | 16  | 8   | 46  |  |
| EA141: Total Insoluble Matter                  |            |        |            |   |   |   |   |  |
| Total Insoluble Matter                         |            | 0.1    | g/m².month | 0.7   | 1.5   | 1.2   | 9.5   |  |
| Total Insoluble Matter (mg)                    |            | 2      | mg         | 12  | 25  | 22  | 149   |  |



#### Inter-Laboratory Testing

Analysis conducted by ALS Newcastle, NATA accreditation no. 825, site no. 1656 (Chemistry) 9854 (Biology).

(AIR) EA125: Combustible Matter

(AIR) EA120: Ash Content

(AIR) EA141: Total Insoluble Matter



Appendix G:

Surface Gas (Methane) Field Sheets. Quarters 1-4

| ALS |  |
|-----|--|

# CHAIN OF CUSTODY □ Sydney: 277 Woodpark Rd. Snithfield NSW 2176 ALS Laboratory: please tick → □ Newcastle: 5 Rosegum Rd, Waratroch NSW 2304 Ph: 02 8784 3555 E samples\_exactle@labernvire.com

 Pf
 Distance
 32 Shared St. Stafford QLD 4053

 am
 Ph:07 3243 7222 Estamples bristbane@aisenviro.com

 304
 Distance@aisenviro.com

 305
 Townsville: 14-15 Deema CL Bohle OLD 4818

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 Ph:07 4736 0600 E: wwwsile anurannemate@aisenviro.com

Melbourne: 2-4 Westall Rd, Springvals VIC 3171
Ph:03 8549 9600 E: samples.melbourne@sileenviro.com
 Adelaide: 2-1 Burna Rd, Pooraka SA 6096
Ph: 08 8359 0860 E.acelaide@alsenviro.com

Perth: 10 Hod Way, Malaga WA 8090
Ph: 08 9209 7655 E: camples.perth@alsenviro.com
Launceston: 27 Wellington St. Launceston TAS 7250
Ph: 03 6331 2158 E: launceston@alsenviro.com

| · · ·              |                                   |  |   |      |         |     | _  |      |         |                  |              | NAME AND ADDRESS OF AD | IN THE REPORT OF T | CONTRACTOR OF A DESCRIPTION OF A DESCRIP | ANALY DESCRIPTION OF THE OWNER OF THE OWNER OF THE OWNER OF |
|--------------------|-----------------------------------|--|---|------|---------|-----|----|------|---------|------------------|--------------|--|--|--|---|
| CLIENT:            | Shellharbour City Council         | TURNAROUND REQUIREM                                  | QUIREMENTS :  Standard TAT (List due date): |      |         |     |    |      |         |                  |              | IORY USE C   | NEY (Circle)   | $\sim$ 10  |   |
| OFFICE:            | 41 Burelli St WOLLONGONG NSW 2500 | me tests Non Standard or urgent TAT (List due date): |   |      |         |     |    |      | G       | isiddy Seal inte | e <b>7</b>   |  | オーン  |  |   |
| PROJECT:           | Dunmore Quarterly Methane Testing | ALS QUOTE NO.:                                       | ALS QUOTE NO.: WO/030/19 TENDER             |      |         |     |    | MBER | (Ĉircle | )                | ceipt?       | un in Kara bi kac  |  | es i N   | - <b>- 4</b> 4  |
| ORDER NUMBER       | ł:                                |  |   | COC: | 1       | 2   | 3  | 4 E  | 6       | 7 Re             | indom Sample | Temperatura di   | n Resaipt  | ¦, , , , , , , , , , , , , , , , , , ,   |   |
| PROJECT MANA       | GER: Joel Culton                  |  |   | OF:  | 1       | 2   | 3  | 4 5  | 6       | 7 0              | het comment. |  |  |  |   |
| SAMPLER:           |                                   | SAMPLER MOBILE:                                      | RELINQUISHED BY:                            | REC  |         | BY: | ,  |      |         | RELING           | QUISHED BY   | :  | RECEIV   | ED BY:   |   |
| COC emailed to A   | ALS? ( YES / NO)                  | EDD FORMAT (or default):                             | Michael                                     |      | 12      | e   | 19 |      |         |                  |              |  |  |  |   |
| Email Reports to   | :                                 |  |   | DATE | E/TIME: | ~   | _  | -    |         | DATE/T           | IME:         |  | DATE/T   | TIME:  |   |
| Email Invoice to : |                                   |  | 13112122                                    | 1    | 311     | 2   | 2  | 2_   |         |                  |              |  |  |  |   |

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: CC reports to:

| ALS USE ONLY  | SAMPLE<br>MATRIX: Sol   | DETAILS<br>id(S) Water(W)   |   | CONTAINER INFORMATION  |                                |                               | IS REQUIE                   | ED includir                    | auite price)<br>quired).         | Additional Information         |                                 |                           |               |  |
|---|---|---|---|--|--------------------------------|-------------------------------|-----------------------------|--------------------------------|----------------------------------|--------------------------------|---------------------------------|---------------------------|---------------|--|
| LAB ID  | SAMPLE ID   | DATE / TIME   | MATRIX  | TYPE & PRESERVATIVE<br>(refer to codes below)  | TOTAL<br>BOTTLES               | Surface<br>Methane<br>Testing |                             |                                |                                  |                                |                                 |                           |               | Comments on likely contaminant levels, ditutions,<br>or samples requiring spedflc QC analysis etc. |
|   | Methane   | 13/12/22  | w   |  |                                | 1                             | 1                           |                                |                                  |                                |                                 |                           |               |  |
|   |   |   |   |  |                                |                               |                             |                                |                                  |                                |                                 |                           |               |  |
|   |   |   |   |  |                                |                               | L                           |                                |                                  |                                |                                 |                           |               |  |
|   |   |   |   |  | -<br>                          |                               |                             |                                |                                  |                                |                                 |                           |               |  |
|   |   |   |   |  |                                | ,<br>                         |                             |                                |                                  |                                |                                 |                           |               |  |
|   |   |   |   |  |                                |                               |                             |                                |                                  |                                |                                 | I                         | l             |  |
|   |   |   |   |  |                                |                               |                             |                                | +                                | Envir<br>Wolld                 | onmer                           | ital Divi                 | sion          |  |
|   |   |   |   |  | <u> </u>                       |                               |                             |                                |                                  | Wo                             | rk Order                        |                           |               |  |
|   |   |   |   |  |                                |                               |                             |                                |                                  |                                | VVZ                             | 2003                      | 920           |  |
|   |   |   | + +   |  |                                |                               |                             |                                |                                  |                                |                                 |                           |               |  |
|   |   |   |   |  |                                |                               |                             |                                |                                  |                                |                                 |                           |               |  |
|   |   |   |   |  |                                |                               |                             |                                |                                  |                                |                                 |                           |               |  |
|   |   |   |   |  |                                |                               |                             |                                |                                  | Telephor                       | ne : 02 422                     | 53125                     |               | ·  |
|   |   |   |   |  |                                |                               |                             |                                |                                  |                                | 1                               | 1                         |               |  |
|   |   |   |   |  | -                              |                               |                             |                                |                                  |                                |                                 |                           |               |  |
| <b> </b>  |   |   |   |  |                                |                               |                             |                                |                                  |                                |                                 |                           |               |  |
|   |   |   |   | тоти   | 10                             |                               |                             |                                |                                  |                                |                                 |                           |               |  |
| Water Container Codes:<br>V = VOA Vial HCI Preserv<br>Z = Zinc Acetate Preserve | P = Unpreserved Plastic; N = Nitric Preser<br>ed; VB = VOA Vial Sodium Bisulphate Prese<br>d Bottle; E = EDTA Preserved Bottles; ST = | rved Plastic; ORC = Nitric Preser<br>erved; VS = VOA Vial Sulfuric Pre<br>Sterile Bottle; ASS = Plastic Bag | ved ORC; SH<br>served; AV = A<br>for Acid Sulph | = Sodium Hydroxide/Cd Preserved; S = Sodiu<br>Airfreight Unpreserved Vial SG = Sulfuric Pres<br>rate Soils; B = Unpreserved Bag. | m Hydroxide P<br>erved Amber ( | reserved Plas<br>Slass; H = H | tic; AG = An<br>CIpreserved | ber Glass Unp<br>Plastic; HS = | preserved; AP -<br>HCI preserved | Airfreight Un<br>Speciation bo | preserved Pla<br>ottle; SP = St | astic<br>Ilfuric Preservi | ed Plastic; F | = Formaldehyde Preserved Glass;  |

|                        |                         |              | ALS Lar  | ndfill Emissions Re | port                                       |
|------------------------|-------------------------|--------------|----------|---------------------|--|
| Client:<br>Site:       | Shellharbour<br>Dunmore | City Council |          | Date:<br>Sampler(s) | 13/12/2022<br>Robert DaLio, Michael Santos |
| Transact /<br>Location | Point                   | GPS North    | GPS East | CH4 Conc (ppm)      | Comments                                   |
| ŀ                      | 4                       |              |          |                     | No Access,                                 |
|                        |                         |              |          |                     |  |
| E                      | 3 1                     | 6168 220     | 302 432  | 0.0                 |  |
| E                      | 3 2                     | 6168 253     | 302 438  | 0.0                 |  |
| E                      | 3 3                     | 6168 280     | 302 437  | 0.0                 |  |
| E                      | 3 4                     | 6168 311     | 302 439  | 0.0                 |  |
| E                      | 3 5                     | 6168 335     | 302 437  | 0.0                 |  |
| E                      | 3 6                     | 6168 376     | 302 435  | 0.0                 |  |
| E                      | 3 7                     | 6168 372     | 302 434  | 0.0                 |  |
|                        |                         |              |          |                     |  |
| (                      | C 1                     | 6168 437     | 302 374  | 0.0                 |  |
|                        | 2 2                     | 6168 406     | 302 381  | 0.0                 |  |
| (                      | 3                       | 6168 362     | 302 393  | 0.0                 |  |
| (                      | C 4                     | 6167 317     | 302 409  | 0.0                 |  |
| (                      | 5 5                     | 6167 253     | 302 415  | 0.0                 |  |
| C                      | 6                       | 6168 182     | 302 422  | 0.0                 |  |

| • |   |          | 1       |     |                |
|---|---|----------|---------|-----|----------------|
| С | 7 | 6168 115 | 302 415 | 1.4 |                |
| С | 8 | 6168 075 | 302 412 | 1.4 |                |
|   |   |          |         |     |                |
| D | 1 | 6168 181 | 302 352 | 0.0 |                |
| D | 2 | 6168 189 | 302 368 | 0.0 |                |
| D | 3 | 6168 195 | 302 366 | 0.0 |                |
| D | 4 |          |         |     | No Safe Access |
| D | 5 |          |         |     | No Safe Access |
| D | 6 |          |         |     | No Safe Access |
|   |   |          |         |     |                |
| E | 1 | 6168     | 302     |     | No Safe Access |
| E | 2 | 6168     | 302     |     | No Safe Access |
| E | 3 | 6168     | 302     |     | No Safe Access |
| E | 4 | 6168 188 | 302 342 | 0.0 |                |
| E | 5 | 6168 202 | 302 340 | 0.0 |                |
| E | 6 | 6168 222 | 302 336 | 0.0 |                |
| E | 7 | 6168 244 | 302 330 | 0.0 |                |
| E | 8 | 6168 255 | 302 324 | 0.0 |                |
|   |   |          |         |     |                |
| F | 1 | 6168 160 | 302 325 | 0.0 |                |
| F | 2 | 6168 170 | 302 323 | 0.0 |                |
| F | 3 | 6168 179 | 302 325 | 0.0 |                |
| F | 4 | 6168 189 | 302 324 | 0.0 |                |

| F | 5  | 6168 241 | 302 314 | 0.0 |  |
|---|----|----------|---------|-----|--|
|   |    |          |         |     |  |
| G | 1  | 6168 410 | 302 249 | 0.0 |  |
| G | 2  | 6168 419 | 302 289 | 0.0 |  |
| G | 3  | 6168 442 | 302 325 | 0.0 |  |
| G | 4  | 6168 466 | 302 360 | 0.0 |  |
|   |    |          |         |     |  |
| Н | 1  | 6168 487 | 302 376 | 0.0 |  |
| н | 2  | 6168 465 | 302 295 | 0.0 |  |
| Н | 3  | 6168 393 | 302 220 | 0.0 |  |
| Н | 4  | 6168 330 | 302 161 | 0.0 |  |
| н | 5  | 6168 277 | 302 112 | 0.0 |  |
| н | 6  | 6168 241 | 302 085 | 0.0 |  |
| н | 7  | 6168 162 | 301 077 | 0.0 |  |
| н | 8  | 6168 078 | 301 073 | 0.0 |  |
| н | 9  | 6167 991 | 302 149 | 2.3 |  |
| н | 10 | 6167 889 | 302 246 | 0.0 |  |
| Н | 11 | 6167 876 | 302 317 | 0.0 |  |
| н | 12 | 6167 887 | 302 423 | 0.0 |  |
| н | 13 | 6168 396 | 302 555 | 0.0 |  |
| Н | 14 | 6168 350 | 302 549 | 0.0 |  |
| Н | 15 | 6168 290 | 302 539 | 0.0 |  |
| Н | 16 | 6168 221 | 302 558 | 0.0 |  |

|  | 1                                    |  |  | 1  |                          |
|--|--------------------------------------|--|--|--|--------------------------|
| Н  | 17                                   | 6168 176   | 302 585  | 0.0  |                          |
| Н  | 18                                   | 6168 122   | 302 620  | 0.0  |                          |
| Н  | 19                                   | 6168 079   | 302 617  | 0.0  |                          |
| Н  | 20                                   | 6168 111   | 302 568  | 0.0  |                          |
| Н  | 21                                   | 6168 160   | 302 540  | 0.0  |                          |
| н  | 22                                   | 6168 093   | 302 513  | 0.0  |                          |
| н  | 23                                   | 6168 230   | 302 525  | 0.0  |                          |
| н  | 24                                   | 6168 291   | 302 530  | 0.0  |                          |
| н  | 25                                   | 6167 380   | 302 544  | 0.0  |                          |
|  |                                      |  |  |  |                          |
|  | 1                                    |  |  |  | NO ACCESS EXCLUSION ZONE |
|  |                                      |  |  |  |                          |
|  |                                      |  |  |  |                          |
| J  | 1                                    | 6168 328   | 302 209  | 0.0  |                          |
| J  | 1                                    | 6168 328<br>6168 294   | 302 209<br>302 221   | 0.0  |                          |
| J<br>J   | 1                                    | 6168 328<br>6168 294<br>6168 256   | 302 209<br>302 221<br>302 231  | 0.0<br>0.0<br>0.0  |                          |
| J<br>J<br>J  | 1<br>2<br>3<br>4                     | 6168 328<br>6168 294<br>6168 256<br>6167 207   | 302 209<br>302 221<br>302 231<br>302 248   | 0.0<br>0.0<br>0.0<br>0.0   |                          |
| J<br>J<br>J  | 1<br>2<br>3<br>4                     | 6168 328<br>6168 294<br>6168 256<br>6167 207<br>6167 179                                     | 302 209<br>302 221<br>302 231<br>302 248<br>302 257                                  | 0.0<br>0.0<br>0.0<br>0.0   |                          |
| J<br>J<br>J<br>J<br>J  | 1<br>2<br>3<br>4<br>5                | 6168 328<br>6168 294<br>6168 256<br>6167 207<br>6167 179                                     | 302 209<br>302 221<br>302 231<br>302 248<br>302 257                                  | 0.0<br>0.0<br>0.0<br>0.0<br>0.0<br>0.0                             |                          |
| J<br>J<br>J<br>J   | 1<br>2<br>3<br>4<br>5                | 6168 328<br>6168 294<br>6168 256<br>6167 207<br>6167 179<br>6168 524                         | 302 209<br>302 221<br>302 231<br>302 248<br>302 257<br>302 389                       | 0.0<br>0.0<br>0.0<br>0.0<br>0.0<br>0.0                             |                          |
| J<br>J<br>J<br>J<br>K  | 1<br>2<br>3<br>4<br>5                | 6168 328<br>6168 294<br>6168 256<br>6167 207<br>6167 179<br>6168 524<br>6168 537             | 302 209<br>302 221<br>302 231<br>302 248<br>302 257<br>302 389<br>302 433            | 0.0<br>0.0<br>0.0<br>0.0<br>0.0<br>0.0<br>0.0                      |                          |
| ی<br>ب<br>ب<br>ب<br>ب<br>ب<br>ب<br>ب<br>ب<br>ب<br>ب<br>ب<br>ب<br>ب<br>ب<br>ب<br>ب<br>ب<br>ب<br>ب | 1<br>2<br>3<br>4<br>5<br>1<br>2      | 6168 328<br>6168 294<br>6168 256<br>6167 207<br>6167 179<br>6168 524<br>6168 537             | 302 209<br>302 221<br>302 231<br>302 248<br>302 257<br>302 389<br>302 433            | 0.0<br>0.0<br>0.0<br>0.0<br>0.0<br>0.0<br>0.0<br>0.0               |                          |
| ј<br>ј<br>ј<br>ј<br>к<br>к   | 1<br>2<br>3<br>4<br>5<br>1<br>2<br>3 | 6168 328<br>6168 294<br>6168 256<br>6167 207<br>6167 179<br>6168 524<br>6168 537<br>6168 563 | 302 209<br>302 221<br>302 231<br>302 248<br>302 257<br>302 389<br>302 433<br>302 459 | 0.0<br>0.0<br>0.0<br>0.0<br>0.0<br>0.0<br>0.0<br>0.0<br>0.0<br>0.0 |                          |

| L                      | 1             | 6168 758                 | 302 336                     | 0.0                     |  |
|------------------------|---------------|--------------------------|-----------------------------|-------------------------|--|
| L                      | 2             | 6168 728                 | 302 321                     | 0.0                     |  |
| L                      | 3             | 6168 707                 | 302 301                     | 0.0                     |  |
| L                      | 4             | 6168 690                 | 302 275                     | 0.0                     |  |
| L                      | 5             | 6168 660                 | 302 247                     | 0.0                     |  |
| L                      | 6             | 6168 636                 | 302 241                     | 0.0                     |  |
|                        |               |                          |                             | •                       |  |
| Compressor<br>Shed     | 1             |                          |                             | 0.0                     |  |
| Office                 | 1             |                          |                             | 0.0                     |  |
| Community<br>Recycling | 1             |                          |                             | 0.0                     |  |
| OLD<br>Weighbridge     | 1             |                          |                             | 0.0                     |  |
| OLD<br>Weighbridge     | 1             |                          |                             | 0.0                     |  |
| Revolve Shop           | 1             |                          |                             | 0.0                     |  |
| Building<br>Truckwash  | 1             |                          |                             | 0.0                     |  |
| wew<br>Weighbridge     | 1             |                          |                             | 0.0                     |  |
|                        |               |                          |                             |                         |  |
|                        |               |                          |                             |                         |  |
| Methane Blank          |               |                          |                             |                         | 1  |
| (Pre testing )         |               |                          |                             | 0.0                     | Taken at entrance to Dunmore site before main gate |
| (Post testing)         |               |                          |                             | 0.0                     | Taken at entrance to Dunmore site before main gate |
|                        |               |                          |                             |                         |  |
| Comments:              |               |                          |                             |                         |  |
| Sampling perform       | ned in accord | ance to EPA Environmenta | l Guidelines Solid Waste La | andfills, Second Editio | on, 2016   |

Gas concentrations are reported as raw values without correction for background concentration.

| н                            | 1                 | 6168 189                     | 302 450                    | 1.1 |  |
|------------------------------|-------------------|------------------------------|----------------------------|-----|--|
| н                            | 2                 | 6168 146                     | 302 443                    | 1.3 |  |
| н                            | 3                 | 6168 046                     | 302 447                    | 1.8 |  |
| н                            | 4                 | 6168 016                     | 302 468                    | 1.7 |  |
| н                            | 5                 | 6167 964                     | 302 494                    | 1.4 |  |
| н                            | 6                 | 6167 917                     | 302 513                    | 1.3 |  |
| н                            | 7                 | 6168 885                     | 301 508                    | 1.7 |  |
| н                            | 8                 | 6167 892                     | 301 475                    | 1.9 |  |
| н                            | 9                 | 6167 928                     | 302 450                    | 2.1 |  |
| н                            | 10                | 6167 741                     | 302 386                    | 1.7 |  |
| н                            | 11                | 6168 800                     | 302 391                    | 2.0 |  |
| н                            | 12                | 6167 857                     | 302 398                    | 1.6 |  |
| н                            | 13                | 6167 921                     | 302 407                    | 1.1 |  |
| н                            | 14                | 6167 972                     | 302 413                    | 0.7 |  |
| Н                            | 15                | 6167 037                     | 302 419                    | 0.7 |  |
| н                            | 16                | 6167 093                     | 302 425                    | 0.7 |  |
| н                            | 17                | 6167 172                     | 302 434                    | 0.6 |  |
|                              | 18                | 6167 271                     | 302 370                    | 0.6 |  |
|                              | 19                | 6167 200                     | 302 221                    | 0.7 |  |
| п                            | 20                | 6167 158                     | 302 144                    | 1.0 |  |
|                              | 21                | 6167 101                     | 302 012                    | 1.0 |  |
| н                            | 22                | 6167 006                     | 301 971                    | 0.7 |  |
| н                            | 24                | 6167 895                     | 302 968                    | 0.8 |  |
| н                            | 25                | 6167 844                     | 302 996                    | 1.8 |  |
| н                            | 25                | 6168 801                     | 301 42                     | 51  |  |
| н                            | 27                | 6168 773                     | 302 067                    | 1.8 |  |
| н                            | 28                | 6168 969                     | 302 145                    | 1.8 |  |
| н                            | 29                | 6168 679                     | 301 204                    | 1.9 |  |
| н                            | 30                | 6167 682                     | 302 261                    | 1.6 |  |
| н                            | 31                | 6167 697                     | 302 328                    | 1.8 |  |
| н                            | 32                | 6167 712                     | 302 378                    | 1.9 |  |
|                              |                   |                              |                            |     |  |
|                              | 1                 | 6167 932                     | 301 154                    | 1.4 |  |
|                              | 2                 | 6167 933                     | 302 104                    | 1.6 |  |
|                              | 3                 | 6167 939                     | 302 049                    | 1.5 |  |
|                              | 4                 | 6167 952                     | 301 995                    | 1.4 |  |
|                              |                   |                              |                            |     |  |
| J                            | 1                 | 6168 147                     | 302 100                    | 1.6 |  |
| J                            | 2                 | 6168 084                     | 302 124                    | 1.5 |  |
| J                            | 3                 | 6168 008                     | 302 153                    | 1.5 |  |
| J                            | 4                 | 6167 970                     | 302 164                    | 1.5 |  |
| J                            | 5                 | 6167 938                     | 302 166                    | 1.5 |  |
|                              |                   |                              |                            |     |  |
|                              |                   | 0400.000                     | 000 007                    |     |  |
| ĸ                            | 1                 | 6168 333                     | 302 287                    | 0.4 |  |
| К                            | 2                 | 6168 350                     | 302 337                    | 0.4 |  |
| К                            | 3                 | 6168 390                     | 302 343                    | 0.6 |  |
| к                            | 4                 | 6168 396                     | 302 301                    | 0.4 |  |
| к                            | 5                 | 6168_364                     | 302_276                    | 0.5 |  |
|                              |                   |                              | L                          |     |  |
| L                            | 1                 | 6168 568                     | 302 232                    | 0.6 |  |
| L                            | 2                 | 6168 563                     | 302 203                    | 0.7 |  |
| L                            | 3                 | 6168 437                     | 302 175                    | 0.8 |  |
| L                            | 4                 | 6168 377                     | 302 125                    | 0.6 |  |
| L                            | 5                 | 6168 340                     | 302 068                    | 0.9 |  |
| L                            | 6                 | 6168 301                     | 302 034                    | 0.9 |  |
|                              | 1                 |                              |                            |     |  |
| Compressor Shed              | 1                 |                              |                            | 2.1 |  |
| Office                       | 1                 | 4                            | +                          | 2.8 |  |
| Community Recycling Centre   | 1                 |                              | +                          | 2.1 |  |
| OLD Weighbridge              | 1                 | 4                            | +                          | 0.5 |  |
| OLD Weighbridge Toilet       | 1                 |                              | +                          | 3.4 |  |
| Revolve Shop                 | 1                 |                              | +                          | 1.8 |  |
| Building Truckwash           | 1                 |                              |                            | 0.6 |  |
| rvow weighdridge             | 11                | 4 <u></u>                    | 1                          | 2.1 |  |
|                              |                   |                              |                            |     |  |
|                              |                   |                              |                            |     |  |
| Methane Blank (Pre testing ) |                   |                              |                            | 1.0 | Taken at entrance to Dunmore site before main gate     |
| wetnane blank (Post testing) | I                 |                              |                            | 0.9 | I divert at entrantCe to Dunmore site before main gate |
|                              |                   |                              |                            |     |  |
| Comments:                    |                   |                              |                            |     |  |
| Comments:                    | e to EPA Environm | ental Guidelines Solid Works | Landfills Second Edition 2 | 016 |  |

| Client:            |        | Shellharbour City C | ouncil    |          | Date:          | 17/12/2021  |
|--------------------|--------|---------------------|-----------|----------|----------------|---|
| Site:              |        | Dunmore             |           |          | Sampler(s)     | Robert DaLio, Megan Gould   |
| Transact / Locatio | on     | Point               | GPS North | GPS East | CH4 Conc (ppm) | Comments  |
|                    | А      |                     |           |          |                | No Vehicle Access, Very Overgrown (Snake Haszrd and uneven footing) |
|                    |        |                     |           |          |                |   |
|                    | в      | 1                   | 6168 021  | 302 330  | 0.4            |   |
|                    | в      | 2                   | 6168 052  | 302 334  | 3.1            | Methane Cage  |
|                    | в      | 3                   | 6168 077  | 302 334  | 0.6            |   |
|                    | в      | 4                   | 6168 102  | 302 332  | 0.8            |   |
|                    | в      | 5-8                 |           |          |                | No Vehicle Access, Very Overgrown (Snake Haszrd and uneven footing) |
|                    |        |                     |           |          |                |   |
|                    | с      | 1                   | 6168 244  | 302 275  | 0.8            |   |
|                    | С      | 2                   | 6168 133  | 302 303  | 0.8            |   |
|                    | С      | 3                   | 6168 076  | 302 313  | 4.0            |   |
|                    | С      | 4                   | 6167 980  | 302 319  | 0.8            |   |
|                    | C      | 5                   | 6167 905  | 302 306  | 0.5            |   |
|                    | C<br>C | 7                   | 6168 857  | 302 299  | 0.6            |   |
|                    | 0      |                     | 0100 040  | 002 204  | 0.4            |   |
|                    | D      | 1                   | 6167 944  | 302 282  | 1.8            |   |
|                    | D      | 2                   | 6167 955  | 302 283  | 1.9            |   |
|                    | D      | 3                   | 6168 977  | 302 277  | 1.2            |   |
|                    | D      | 4-9                 |           |          |                | No Vehicle Access, Very Overgrown (Snake Haszrd and uneven footing) |
|                    |        |                     |           | 1        |                |   |
|                    | E      | 1                   | 6168 023  | 302 230  | 1.4            |   |
|                    | E      | 2                   | 6168 032  | 302 227  | 1.6            |   |
|                    | F      | 3                   | 6167 994  | 302 223  | 1.8            |   |
|                    | F      | 5                   | 6167 948  | 302 266  | 1.4            |   |
|                    | -      |                     |           |          |                |   |
|                    | F      | 1                   | 6167 939  | 302 248  | 1.0            |   |
|                    | F      | 2                   | 6167 962  | 302 237  | 0.8            |   |
|                    | F      | 3                   | 6167 986  | 302 227  | 1.3            |   |
|                    | F      | 4                   | 6168 013  | 302 214  | 0.8            |   |
|                    | F      | 5                   |           |          |                | No Vehicle Access, Very Overgrown (Snake Haszrd and uneven footing) |
|                    | F      | 6                   |           |          |                | No Vehicle Access, Very Overgrown (Snake Haszrd and uneven footing) |
|                    | c      | 4                   | 6168 218  | 302 180  | 11             |   |
|                    | G      | 2                   | 6168 233  | 302 193  | 1.0            |   |
|                    | G      | 3                   | 6168 241  | 302 207  | 1.0            |   |
|                    |        |                     |           | 1        |                |   |

| CHAIN OF CUSTODY              | El Sydney 277 Woodpark Rd. Smithfield NSW 2176<br>Phr 02 8784 5555 Eisemples.syoney@alsenvire.com  |
|-------------------------------|--|
| ALS Laboratory: please tick > | CI Newcastle: 5 Rosegum Rd, Warabrook NSW 2304<br>Ph 92 4968 9405 E samples newcastle@alserium.com |

E Brisbane: 32 Shand St. Stafford QLD 4053 Ph:07 3243 7222 Eisamples brisbane@alserviro.com Ph.07 3243 7222 C Samples briesderigederinn over Towardelle 14-15 Desma Ct. Bohle OLD 4816 Ph.07 4796 0500 E: tomaile enrorinnesideatemación Ph.07 8329 0800 E acelaide@alcentre.com

Launceston: 27 Weilington St. Launceston TAS 795() Ph. 03 6331 2158 Et laundestoni@ainenvim.com

| · · · ·                |                                       | -                                    |                |   |                         |                               |                       |                             |   |   |
|------------------------|---------------------------------------|--------------------------------------|----------------|---|-------------------------|-------------------------------|-----------------------|-----------------------------|---|---|
| CLIENT:                | Shellharbour City Council             |                                      |                | UND REQUIREMENTS :                              | Standard TAT (Lis       | due date):                    |                       |                             | FOR LABORATORY USE  | ONLY (Circle)                                     |
| OFFICE:                | 41 Burelli St WOLLONGONG I            | NSW 2500                             | e.g Ultra Tra  | r may be longer for some tests<br>ice Organics) | Non Standard or u       | gent TAT (List                | due date):            |                             | Custody Seal Intact?  | Yes No Nia  |
| PROJECT:               | Dunmore Quarterly Methane             | Festing                              | ALS QUOT       | E NO.: WO/030                                   | 0/19 TENDER             |                               | COC SEQU              | JENCE NUMBER (Circle        | <ul> <li>Free ice / frozen ice bricks pre-<br/>receipt?</li> </ul>                            | entupon Yes No N/A                                |
| ORDER NUMBER:          |                                       |                                      |                |   |                         |                               | COC: 1 2              | 3 4 5 6                     | 7 Random Semple Temperature   | on Receipt 🗘 🗸                                    |
| PROJECT MANAGER        | ; Ryan Stirling                       |                                      |                |   |                         |                               |                       | 3 4 5 6                     | 7 Other comment:  |   |
| SAMPLER:               |                                       | SAMPLER                              | MOBILE:        |   | RELINQUISHED BY:        | ,                             | RECEIVED BY:          | 04                          | RELINQUISHED BY:  | RECEIVED BY:                                      |
| COC emailed to ALS?    | (YES / NO)                            | EDD FORM                             | MAT (or defaul | t):   | Michael                 |                               | IT IT                 | nufq                        |   |   |
| Email Reports to :     |                                       |                                      |                |   | DATE/TIME:              |                               | DATE/TIME:            | 1. 100                      | DATE/TIME:  | DATE/TIME:  |
| Email Invoice to :     |                                       |                                      |                |   | 2116 123                |                               |                       | 16123                       |   |   |
| COMMENTS/SPECIAL       | HANDLING/STORAGE OR DISF              | OSAL: CC reports to                  | 0:             |   |                         |                               |                       |                             |   |   |
| ALS USE ONLY           | SA<br>MATRI                           | MPLE DETAILS<br>X: Solid(S) Water(W) |                | CONTAINER INFO                                  | RMATION                 | ANALYSIS<br>Where Ma          | REQUIRED includi      | ng SUITES (NB, Suite C      | odes must be listed to attract suite price)<br>or Dissolved (field filtered bottle required). | Additional Information                            |
|                        | 38 ···                                |                                      |                |   |                         |                               |                       |                             |   | Comments on likely contaminant levels, dilutions, |
| LAB ID                 | SAMPLE ID                             | DATE / TIME                          | MATRIX         | TYPE & PRESERVATI<br>(refer to codes below,     | YE TOTAL<br>BOTTLES     | Surface<br>Wethane<br>Testing |                       |                             |   | or samples requiring specific QC analysis etc.    |
|                        | Methane                               | 2116123                              | w              |   |                         | √ 2                           |                       |                             |   | · · · · · · · · · · · · · · · · · · ·             |
|                        |                                       | 0.101-5                              |                |   |                         |                               |                       |                             |   |   |
|                        |                                       |                                      |                |   |                         |                               |                       |                             |   |   |
|                        |                                       |                                      |                |   |                         |                               |                       |                             |   |   |
|                        |                                       |                                      |                |   |                         |                               |                       |                             |   |   |
|                        |                                       |                                      |                |   |                         |                               |                       |                             |   |   |
|                        |                                       |                                      |                |   |                         |                               |                       |                             |   |   |
|                        |                                       |                                      |                |   |                         |                               |                       |                             |   |   |
|                        |                                       |                                      |                |   |                         |                               |                       |                             |   |   |
|                        |                                       |                                      |                |   |                         |                               |                       |                             |   |   |
|                        |                                       | ,                                    |                |   |                         |                               |                       |                             |   |   |
|                        |                                       |                                      |                |   |                         |                               |                       | Environ                     |   |   |
|                        |                                       |                                      |                |   |                         |                               |                       | Wollong                     | mental Division   | ]   |
|                        |                                       |                                      |                |   |                         |                               |                       | Work                        | Order Baferones   | 1   |
|                        |                                       |                                      |                | -   |                         |                               |                       | E FN                        | 12302811  | 1   |
|                        |                                       |                                      |                |   |                         |                               |                       | + <b></b> ,                 |   |   |
|                        |                                       |                                      |                |   |                         |                               |                       |                             |   |   |
|                        | · · ·                                 |                                      |                |   |                         |                               |                       |                             | 動物との実施化   |   |
|                        |                                       |                                      |                | ·····   |                         |                               |                       | ▏▁▁▁▋╢▐▓                    |   | 1   |
|                        |                                       |                                      |                |   |                         |                               |                       | ⊢ ∎₩₽.                      | 户时, <b>推了</b> 到11   |   |
|                        |                                       |                                      |                |   |                         |                               |                       |                             | いる はかり (1997年1月11月)   | <u>i</u>  |
|                        |                                       |                                      |                |   |                         |                               |                       | Telephone : 02              | 42253125  |   |
|                        |                                       |                                      |                |   |                         |                               |                       | +                           |   |   |
|                        |                                       |                                      |                |   |                         |                               |                       |                             |   |   |
|                        | in the second street                  |                                      |                |   | TOTAL 10                |                               |                       |                             |   |   |
| water Container Codes: | P – Unpreserved Plastic; N = Nitric P | reserved Plastic; QRC = Nitric Prese | rved ORC; SH ≖ | Socium rivaroxide/Gd Preserved;                 | 5 = Sodium Hydroxide Pr | served Plastic; /             | Amber Glass Unpr - ex | eserved; AP - Aintreight Ui | preserved Plastic   |   |

V = VOA Vial HCI Preserved; VB = VOA Vial Sulphate Preserved; VS = VOA Vial Sulphate Preserved; VS = VOA Vial Sulphate Preserved; VA = Anneer Glass; H = HCI preserved; VB = HCI preserved; VS = VOA Vial Sulphate Preserved; VS = VOA Vial Sulphate

|                     |                   |                      | aport    |                |                              |   |
|---------------------|-------------------|----------------------|----------|----------------|------------------------------|---|
| Client:             | Shellbarbour City | Council              |          | Date           | 21/06/2023                   |   |
| Site:               | Dunmore           |                      |          | Sampler(s)     | Robert DaLio, Michael Santos |   |
| Transact / Location | Point             | GPS North            | GPS East | CH4 Conc (ppm) | Comments                     |   |
| ,                   | 4                 |                      |          |                | No Safe Access               |   |
|                     |                   |                      |          |                |                              |   |
|                     |                   | e169 000             | 202,422  | 0.0            |                              |   |
|                     | 1                 | 0100 222             | 302 433  | 0.0            |                              |   |
| E                   | 3 2               | 6168 238             | 302 436  | 0.0            |                              |   |
| E                   | 3 3               | 6168 263             | 302 436  | 0.0            |                              |   |
|                     | 3 4               | 6168 290             | 302 439  | 0.0            |                              |   |
|                     | 1                 |                      |          |                |                              |   |
| (                   | 1                 | 6168 439             | 302 374  | 0.0            |                              |   |
| (                   | 2 2               | 6168 391             | 302 389  | 0.0            |                              |   |
| (                   | 3                 | 6168 326             | 302 410  | 0.1            |                              | - |
| (                   | 4                 | 6167 252             | 302 422  | 0.1            |                              |   |
| (                   | 5                 | 6167 206             | 302 424  | 0.1            |                              |   |
| (                   | 6                 | 6168 164             | 302 423  | 0.1            |                              | - |
| (                   | 7                 | 6168 107             | 302 411  | 0.0            |                              | - |
| (                   | 8                 | 6168 055             | 302 406  | 0.0            |                              |   |
|                     | 1                 | 1                    | 1        |                |                              |   |
|                     | 1                 | 6168 202             | 302 399  | 0.1            |                              |   |
| [                   | 2 2               | 6168 191             | 302 402  | 0.0            |                              |   |
|                     | 3                 | 6168 180             | 302 403  | 0.0            |                              | - |
|                     | 4                 | 6168 173             | 302 405  | 0.0            |                              | - |
|                     | 5                 | 6168 159             | 302 408  | 0.0            |                              |   |
|                     | 6                 | 6168 149             | 302 407  | 0.0            |                              |   |
|                     | 7                 | 6168 137             | 302 405  | 0.1            |                              |   |
|                     | 1                 |                      |          |                |                              |   |
| E                   | 1                 | 6168 145             | 302 375  | 0.0            |                              |   |
| E                   | 2                 | 6168 157             | 302 376  | 0.0            |                              |   |
|                     | 3                 | 6168 172             | 302 378  | 0.0            |                              |   |
|                     | 4                 | 6168 173             | 302 377  | 0.0            |                              |   |
| E                   | 5                 | 6168 181             | 302 376  | 0.0            |                              |   |
|                     | 1                 |                      |          | 1              |                              |   |
| F                   | 1                 | 6168 134             | 302 352  | 0.0            |                              |   |
| F                   | 2                 | 6168 145             | 302 349  | 0.0            |                              |   |
| F                   | F 3               | 6168 149             | 302 337  | 0.0            |                              |   |
| -                   | 4                 | 6168 159             | 302 331  | 0.0            |                              |   |
|                     | 5                 | 6168 158             | 302 325  | 0.0            |                              |   |
| F                   | 6                 | 6168 157             | 302 320  | 0.0            |                              |   |
|                     | 1                 |                      |          |                |                              |   |
|                     | 1                 | 6168 410             | 302 256  | 0.0            |                              | - |
| 6                   | 2                 | 0108 420<br>6169 440 | 302 283  | 0.0            |                              |   |
|                     | 3 4               | 6168 464             | 302 321  | 0.0            |                              | - |

| н   | 1   | 6168 411  | 302 554   | 0.0   |  |
|---|---|---|---|---|--|
| н   | 2   | 6168 360  | 302 553   | 0.0   |  |
| н   | 3   | 6168 322  | 302 541   | 0.0   |  |
|   |   | 0108 322  | 302 541   | 0.0   |  |
| н   | -   | 6168 310  | 302 555   | 0.0   |  |
|   |   | 0108 213  | 302 303   | 0.0   |  |
|   |   | 0100 100  | 302 381   | 0.0   |  |
| н   |   | 6108 144  | 301 604   | 0.0   |  |
| н   | 8   | 6168 101  | 301 631   | 0.0   |  |
| н   | 9   | 6168 076  | 302 599   | 0.0   |  |
| н   | 10  | 6168 118  | 302 556   | 0.1   |  |
| н   | 11  | 6168 159  | 302 533   | 0.1   |  |
| н   | 12  | 6168 046  | 302 520   | 0.1   |  |
| н   | 13  | 6168 038  | 302 500   | 0.0   |  |
| н   | 14  | 6168 090  | 302 511   | 0.0   |  |
| н   | 15  | 6168 135  | 302 513   | 0.0   |  |
| н   | 16  | 6167 197  | 302 520   | 0.0   |  |
| н   | 17  | 6167 257  | 302 524   | 0.0   |  |
| н   | 18  | 6167 471  | 302 322   | 0.0   |  |
| н   | 19  | 6167 448  | 302 277   | 0.0   |  |
| н   | 20  | 6167 394  | 302 218   | 0.0   |  |
| н   | 21  | 6167 278  | 302 160   | 0.0   |  |
| н   | 22  | 6167 225  | 302 111   | 0.0   |  |
| н   | 23  | 6167 225  | 302 072   | 0.0   |  |
| н   | 24  | 6168 012  | 302 064   | 0.0   |  |
| н   | 25  | 6168 093  | 302 91  | 0.1   |  |
| н   | 26  | 6168 150  | 302 150   | 0.0   |  |
| н   | 27  | 6168 197  | 302 186   | 0.0   |  |
| н   | 28  | 6168 250  | 302 240   | 0.1   |  |
| н   | 29  | 6168 288  | 302 313   | 1.2   |  |
| н   | 30  | 6168 345  | 302 404   | 0.0   |  |
| н   | 31  | 6168 446  | 302 484   | 0.0   |  |
|   |   |   |   |   |  |
|   | 1   |   |   |   | NO ACCESS CONSTRUCTION                             |
|   |   |   |   |   |  |
|   |   |   |   |   |  |
| 1   | 1   | 6168 347  | 302 198   | 0.0   |  |
| L   | 1   | 6168 347<br>6168 324  | 302 198<br>302 207  | 0.0   |  |
| د<br>ا  | 2   | 6168 347<br>6168 324<br>6168 306  | 302 198<br>302 207<br>302 216   | 0.0   |  |
| د<br>ل<br>ل   | 3   | 6168 347<br>6168 324<br>6168 306  | 302 198<br>302 207<br>302 216   | 0.0   |  |
| د<br>ل<br>ل   | 3   | 6168 347<br>6168 324<br>6168 306<br>6167 284  | 302 198<br>302 207<br>302 216<br>302 225  | 0.0<br>0.0<br>0.0   |  |
| د<br>ر<br>ر<br>ر  | 3   | 6168 347<br>6168 324<br>6168 306<br><u>6167</u> 284   | 302 198<br>302 207<br>302 216<br>302 225  | 0.0<br>0.0<br>0.0   |  |
| د<br>د<br>د<br>ب<br>ب<br>ب  | 3   | 6168 347<br>6168 324<br>6168 306<br>6167 284<br>6168 523  | 302 198<br>302 207<br>302 216<br>302 225<br>302 396   | 0.0 0.0 0.0 0.0 0.0 0.0 0.0   |  |
| J   | 1<br>2<br>3<br>4<br>1<br>2                                | 6168 347<br>6168 324<br>6168 306<br>6167 284<br>6168 523<br>6168 523  | 302 198<br>302 207<br>302 216<br>302 225<br>302 396<br>302 446  | 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0                                     |  |
| J   | 1   | 6168 347<br>6168 324<br>6168 306<br>6167 284<br>6168 523<br>6168 523<br>6168 540<br>6168 581  | 302 198<br>302 207<br>302 216<br>302 225<br>302 225<br>302 396<br>302 446<br>302 448  | 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0                                     |  |
| J<br>J<br>K<br>K<br>K   | 1<br>2<br>3<br>4<br>1<br>2<br>2<br>3                      | 6168 347<br>6168 324<br>6168 306<br>6167 284<br>6168 523<br>6168 523<br>6168 540<br>6168 540  | 302 198<br>302 207<br>302 216<br>302 225<br>302 246<br>302 446<br>302 448<br>302 448  | 00 00 00 00 00 00 00 00 00 00 00 00 00                                      |  |
| ј<br><br>К<br>К<br>К  | 1   | 6168 347<br>6168 324<br>6168 326<br>6168 306<br>6168 523<br>6168 540<br>6168 540<br>6168 540<br>6168 580  | 302 198<br>302 207<br>302 216<br>302 225<br>302 396<br>302 446<br>302 448<br>302 448  | 0.0<br>0.0<br>0.0<br>0.0<br>0.0<br>0.0<br>0.0<br>0.0                        |  |
|   | 1<br>2<br>3<br>4<br>1<br>2<br>2<br>3<br>4<br>4<br>5       | 6168 347<br>6168 324<br>6168 306<br>6167 284<br>6168 523<br>6168 540<br>6168 540<br>6168 581<br>6168 580<br>6168 546  | 302 198<br>302 207<br>302 216<br>302 225<br>302 396<br>302 446<br>302 448<br>302 387<br>302 376   | 0.0<br>0.0<br>0.0<br>0.0<br>0.0<br>0.0<br>0.0<br>0.0<br>0.0                 |  |
|   | 1<br>2<br>3<br>4<br>1<br>2<br>2<br>3<br>3<br>4<br>4<br>5  | 6168 347<br>6168 324<br>6168 305<br>6168 523<br>6168 523<br>6168 520<br>6168 540<br>6168 580<br>6168 540  | 302 198<br>302 207<br>302 216<br>302 225<br>302 396<br>302 396<br>302 446<br>302 448<br>302 387<br>302 376  | 00 00 00 00 00 00 00 00 00 00 00 00 00                                      |  |
|   | 1<br>2<br>3<br>4<br>1<br>2<br>2<br>3<br>3<br>4<br>4<br>5  | 0168 347<br>0168 324<br>0168 326<br>0167 284<br>0168 522<br>0168 542<br>0168 543<br>0168 543<br>0168 543<br>0168 545<br>0168 545<br>0168 545  | 302 168<br>302 207<br>302 216<br>302 226<br>302 226<br>302 398<br>302 446<br>302 446<br>302 387<br>302 387<br>302 376   | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00                    |  |
|   |   | 0168 347<br>0168 324<br>0168 326<br>0162 284<br>0168 522<br>0168 542<br>0168 540<br>0168 540<br>0168 540<br>0168 540<br>0168 540<br>0168 540  | 302 168<br>302 207<br>302 216<br>302 226<br>302 289<br>302 398<br>302 446<br>302 446<br>302 449<br>302 376<br>302 376<br>302 370  | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00              |  |
|   |   | 6168 347<br>6188 324<br>6188 324<br>6188 522<br>6188 522<br>6188 540<br>6188 5  | 302 168<br>302 207<br>302 216<br>302 216<br>302 255<br>302 466<br>302 446<br>302 397<br>302 376<br>302 376<br>302 378<br>302 378  | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00  |  |
|   |   | 0168 347<br>0168 344<br>0168 306<br>0162 204<br>0168 522<br>0168 540<br>0168 540<br>0168 540<br>0168 540<br>0168 540<br>0168 540<br>0168 540<br>0168 540<br>0168 540<br>0168 740<br>0168 740<br>0168 653  | 302 168<br>302 207<br>302 216<br>302 226<br>302 246<br>302 446<br>302 448<br>302 337<br>302 376<br>302 370<br>302 329<br>302 303<br>302 229<br>302 248  | 00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00<br>00  |  |
|   |   | 0168 347<br>0168 344<br>0168 356<br>0162 244<br>0168 522<br>0168 522<br>0168 540<br>0168  302 168<br>302 207<br>302 216<br>302 225<br>302 285<br>302 446<br>302 446<br>302 446<br>302 387<br>302 376<br>302 376<br>302 376<br>302 376<br>302 276<br>302 226   |   |  |
|   |   | 0168 347<br>0168 344<br>0168 326<br>0162 284<br>0168 553<br>0168 553<br>0168 540<br>0168 5  | 302 168<br>302 207<br>302 216<br>302 216<br>302 25<br>302 366<br>302 446<br>302 397<br>302 376<br>302 376<br>302 376<br>302 370<br>302 370<br>302 279<br>302 279<br>302 279<br>302 279<br>302 279<br>302 279<br>302 279   |   |  |
|   |   | 6168 347<br>0168 344<br>0168 324<br>0168 522<br>0168 522<br>0168 520<br>0168 520<br>0168 540<br>0168 540<br>0168 540<br>0168 740<br>0168 740<br>0168 740<br>0168 640<br>0168 740<br>0168 640<br>0168 6  | 302 168<br>302 207<br>302 216<br>302 225<br>302 306<br>302 446<br>302 448<br>302 307<br>302 376<br>302 376<br>302 379<br>302 329<br>302 229<br>302 228<br>302 228<br>302 228  |   |  |
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# CHAIN OF CUSTODY □ Sydney: 277 Woodpark Po., Smithleid NSW 2178 ALS Laboratory: please tick → □ Newcastle: 5 Rasegum Rc, Warabrook NSW 2304

Brisbane: 32 Shand St, Stafford QUD 4063
 Ph:07 3243 7222 Eisangleis histore@gesentitic.com
 C Townsvilla: 14-15 Desma Ct Bohie QLD 4613
 Ph:07 4795 0600 Ei tovicalis an archmonul@sterviro.com

Melbourne: 2-4 Westall Rd. Springvale VIC 3174
Ph:03 8549 9800 El samples melbourne@alsenvin.com
Adelaidos 2-1 Burna Rd. Poaraka SA 5095
Ph: 08 4859 0980 Eseñaledaalsenvio com

Perth 10 Hod Way Malega WA 6090
 Ph.05 9209 7865 & samples.sech@alsemmic.com
 Lanceston: 27 Wallingron St. Lanceston: TAS 7260
 Ph.05 933 21536 E Jaunceston@alsemmic.com

|                     |                                 |                  | ·              |  |             |                  |                 |                 |           |         |               |          |            |         |              |                             |  |   |
|---------------------|---------------------------------|------------------|----------------|--|-------------|------------------|-----------------|-----------------|-----------|---------|---------------|----------|------------|---------|--------------|-----------------------------|--|---|
| CLIENT:             | Shellharbour City Council       |                  | TURNAROL       | JND REQUIREMENTS :   | 🗌 Standa    | ard TAT (List    | due date):      |                 |           |         |               |          |            |         | FC           | R LABORAT                   | ORY USE O                                | ILY (Circle)  |
| OFFICE:             | 41 Burelli St WOLLONGONG NSW    | 2500             | (Standard TAT  | imay be longer for some tests concerned tests concerned to the set of the set | Non St      | tandard or urg   | gent TAT (List  | due date)       |           |         |               |          |            |         | Cu           | eicdy Seaf Intec            | 7  | Yee No 1  |
| PROJECT:            | Dunmore Quarterly Methane Testi | ng               | ALS QUOTI      | E NO.: WO/0  | 30/19 TENDE | ER               |                 |                 | coc       | SEQI    | JENCE N       | UMBE     | R (Cir     | cle)    | E te         | ae ise / mozen is<br>selpt? | e pricks presen                          | rupon Yes No 🯹  |
| ORDER NUMBER:       |                                 |                  |                |  |             |                  |                 | COC:            | 1         | 2       | 3             | 4        | 5          | 6       | 7 Ros        | ndom Sample T               | emperature on                            | Receipt: C  |
| PROJECT MANAGER:    | Ryan Stirling                   |                  |                |  |             |                  |                 | OF:             | 1         | 2       | 3             | 4        | 5          | 6       | 7 Q          | her comment:                | a an an an an an an an an an an an an an |   |
| SAMPLER:            |                                 | SAMPLER          | MOBILE:        |  | RELINQUE    | SHED BY:         | ,               | RECI            | EIVED     | BY:     |               | ,        |            |         | RELING       | UISHED BY:                  |  | RECEIVED BY:  |
| COC emailed to ALS? | ( YES / NO)                     | EDD FOR          | AT (or default | ):   | Mic         | has              | $\sim$          |                 | ŧ         | 4       | es            | ~        |            |         |              |                             |  |   |
| Email Reports to :  |                                 |                  |                |  | DATE/TIME   | E:               |                 | DATE            |           | د       |               | _        |            |         | DATE/T       | IME:                        |  | DATE/TIME:  |
| Email Invoice to :  |                                 | ,                |                |  | 28          | 1912             | <u> </u>        | 4               | 20        | Μ       | 12            | 5        |            |         |              |                             |  |   |
| COMMENTS/SPECIAL    | HANDLING/STORAGE OR DISPOS      | AL: CC reports t | D:             |  |             |                  |                 |                 |           |         |               |          |            |         |              |                             |  |   |
|                     |                                 | E DETANC         |                |  |             |                  | ANALYSI         | S REQUIR        | ED in     | cludi   | ng SUIT       | ES (N    | B. Suite   | Code    | es must be   | e listed to attract         | suite price)                             |   |
| ALS USE ONLY        | MATRIX: SO                      | blid(S) Water(W) |                | CONTAINER INI  | FORMATION   |                  | Where I         | vletais are req | uired, sp | ecify 1 | otal (unfilte | red boti | le require | d) or D | Dissolved (i | field filtered bottle re    | equired).                                | Additional information  |
|                     |                                 |                  |                |  |             | ŀ                |                 |                 |           |         |               |          |            |         |              |                             |  | Comments on likely contaminant levels, dilut<br>or samples requiring specific QC analysis etc |
| LAB ID              | SAMPLE ID                       | DATE / TIME      | MATRIX         | TYPE & PRESERVA<br>(refer to codes belo  | TIVE<br>w)  | TOTAL<br>BOTTLES | ce<br>ane<br>ng |                 |           |         |               |          |            |         |              |                             |  |   |

|                     | SAMPLEID   |  |                                   | (refer to codes below)   | BOTTLES                              | urface<br>ethan<br>isting                |   |   |   |  |                       |           |
|---------------------|--|--|-----------------------------------|--|--------------------------------------|--|---|---|---|--|-----------------------|-----------|
|                     |  |  |                                   |  |                                      | ŏŽμ"                                     |   |   |   |  |                       |           |
|                     | Methane  | 2019123  | w                                 |  |                                      |  |   |   |   |  |                       |           |
|                     |  |  |                                   |  |                                      |  |   |   |   |  |                       |           |
|                     |  |  |                                   |  |                                      |  |   |   |   |  |                       |           |
|                     |  |  |                                   |  |                                      |  |   |   |   |  |                       |           |
|                     |  |  |                                   |  |                                      |  |   |   |   |  |                       |           |
|                     |  |  |                                   |  |                                      |  |   |   | Tau dirop MB  | ntal Divisic                                 | <u>1</u>              |           |
|                     |  |  |                                   |  | -                                    |  |   |   | Wollongon   | g<br>Butaron(A                               |                       |           |
|                     |  |  |                                   |  | -                                    |  |   |   | Work Ord  | 530432                                       | 6                     |           |
|                     |  |  |                                   |  |                                      |  |   |   |   |  |                       |           |
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|                     |  |  |                                   |  |                                      |  |   |   |   | ארי ישר 1996<br>ארי ישר 1996<br>ארי ישר 1996 |                       |           |
|                     |  |  | +                                 |  |                                      |  |   |   | Telephone to  | 24220-                                       | ;                     |           |
|                     |  |  |                                   |  |                                      |  |   |   |   |  |                       |           |
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|                     |  |  |                                   | TO   | na. 10                               |  |   |   |   |  |                       |           |
| ter Container Codes | <ul> <li>P = Unpreserved Plastic; N = Nitric Pr</li> <li>ved: VB = VOA Vial Sodium Bisulohate F</li> </ul> | reserved Plastic; ORC = Nitric Preser<br>Preserved: VS = VOA Vial Sulfuric Pre | ved ORC; SH =<br>served; AV = Air | Sodium Hydroxide/Cd Preserved; S = So<br>freight Unpreserved Vial SG = Sulfuric Pr | dium Hydroxide P<br>reserved Amber ( | reserved Plastic; A<br>Slass; H = HCl pr | G = Amber Glass Un<br>eserved Plastic; HS = | preserved; AP - Airfreig<br>HCI preserved Speciat | ht Unpreserved Plastic<br>ion bottle; SP ≃ Sulfuric I | Preserved Plastic; F =                       | Formaldehyde Preservo | ed Glass; |
| inc Acetate Preserv | ed Bottle; E = EDTA Preserved Bottles; S   | ST = Sterile Bottle; ASS = Plastic Bac   | for Acid Sulpha                   | e Soils; B = Unpreserved Bag.  |                                      |  | -   |   |   |  |                       |           |



## **CERTIFICATE OF ANALYSIS**

| Work Order              | EW2304326                                     | Page                    | : 1 of 23  |
|-------------------------|---|-------------------------|--|
| Client                  | SHELLHARBOUR CITY COUNCIL                     | Laboratory              | Environmental Division NSW South Coast                     |
| Contact                 | : Ryan Stirling                               | Contact                 | : Aneta Prosaroski   |
| Address                 | : LAMERTON HOUSE, LAMERTON CRESCENT           | Address                 | : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia |
|                         | SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529 |                         |  |
| Telephone               | :   | Telephone               | : +61 2 4225 3125  |
| Project                 | : Dunmore Landfill Methane                    | Date Samples Received   | : 20-Sep-2023 16:00  |
| Order number            | : 156810                                      | Date Analysis Commenced | : 29-Sep-2023  |
| C-O-C number            | :   | Issue Date              | 29-Sep-2023 16:10  |
| Sampler                 | : Michael Santos, Robert DaLio                |                         |  |
| Site                    | : DUNMORE LANDFILL TENDER                     |                         |  |
| Quote number            | : WO/030/19 TENDER METHANE                    |                         |  |
| No. of samples received | : 103   |                         |  |
| No. of samples analysed | · 103   |                         |  |

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

#### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| Signatories      | Position                              | Accreditation Category           |
|------------------|---------------------------------------|----------------------------------|
| Aneta Prosaroski | Environmental Services Representative | Administration - Wollongong, NSW |



#### **General Comments**

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

~ = Indicates an estimated value.

- Analytical work for this work order will be conducted at ALS Sydney.
- Sampling performed By Wollongong in accordance to EPA Environmental Guidelines Solid Waste Landfills, Second Edition, 2016
- Gas concentrations are reported as raw values without correction for background concentration.



| Sub-Matrix: GAS     |            |        | Sample ID      | А                 | В                 | В                 | В                 | В                 |
|---------------------|------------|--------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| (Matrix: GAS)       |            |        |                | 1-8               | 1                 | 2                 | 3                 | 4                 |
|                     |            | Sampli | ng date / time | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 |
| Compound            | CAS Number | LOR    | Unit           | EW2304326-001     | EW2304326-002     | EW2304326-003     | EW2304326-004     | EW2304326-005     |
|                     |            |        |                | Result            | Result            | Result            | Result            | Result            |
| Sampling Data       |            |        |                |                   |                   |                   |                   |                   |
| Transact / Location |            | -      | -              | Α                 | В                 | В                 | В                 | В                 |
| Point               |            | -      | -              | 1-8               | 1                 | 2                 | 3                 | 4                 |
| GPS North           |            | -      | -              |                   | 6168225           | 6168261           | 6168286           | 6168293           |
| GPS East            |            | -      | -              |                   | 302435            | 302440            | 302441            | 302441            |
| CH4 Conc (ppm)      |            | -      | ppm            |                   | 0.1               | 0.0               | 0.0               | 0.0               |
| Comments            |            | -      | -              | NO ACCESS         |                   |                   |                   |                   |



| Sub-Matrix: GAS     |            |        | Sample ID      | С                 | С                 | С                 | С                 | С                 |
|---------------------|------------|--------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| (Matrix: GAS)       |            |        |                | 1                 | 2                 | 3                 | 4                 | 5                 |
|                     |            | Sampli | ng date / time | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 |
| Compound            | CAS Number | LOR    | Unit           | EW2304326-006     | EW2304326-007     | EW2304326-008     | EW2304326-009     | EW2304326-010     |
|                     |            |        |                | Result            | Result            | Result            | Result            | Result            |
| Sampling Data       |            |        |                |                   |                   |                   |                   |                   |
| Transact / Location |            | -      | -              | C                 | C                 | С                 | C                 | С                 |
| Point               |            | -      | -              | 1                 | 2                 | 3                 | 4                 | 5                 |
| GPS North           |            | -      | -              | 6168434           | 6168363           | 6168297           | 6168239           | 6168163           |
| GPS East            |            | -      | -              | 302379            | 302390            | 302416            | 302420            | 302422            |
| CH4 Conc (ppm)      |            | -      | ppm            | 0.0               | 0.0               | 0.5               | 1.2               | 1.0               |



| Sub-Matrix: GAS     |            |        | Sample ID      | С                 | D                 | D                 | D                 | D                 |
|---------------------|------------|--------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| (Matrix: GAS)       |            |        |                | 6                 | 1                 | 2                 | 3                 | 4                 |
|                     |            | Sampli | ng date / time | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 |
| Compound            | CAS Number | LOR    | Unit           | EW2304326-011     | EW2304326-012     | EW2304326-013     | EW2304326-014     | EW2304326-015     |
|                     |            |        |                | Result            | Result            | Result            | Result            | Result            |
| Sampling Data       |            |        |                |                   |                   |                   |                   |                   |
| Transact / Location |            | -      | -              | С                 | D                 | D                 | D                 | D                 |
| Point               |            | -      | -              | 6                 | 1                 | 2                 | 3                 | 4                 |
| GPS North           |            | -      | -              | 6168080           | 6168272           | 6168257           | 6168241           | 6168220           |
| GPS East            |            | -      | -              | 302412            | 302393            | 302393            | 302388            | 302389            |
| CH4 Conc (ppm)      |            | -      | ppm            | 7.8               | 0.1               | 0.0               | 1.4               | 0.0               |



| Sub-Matrix: GAS     |            |        | Sample ID      | D                 | D                 | D                 | Е                 | E                 |
|---------------------|------------|--------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| (Matrix: GAS)       |            |        |                | 5                 | 6                 | 7                 | 1                 | 2                 |
|                     |            | Sampli | ng date / time | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 |
| Compound            | CAS Number | LOR    | Unit           | EW2304326-016     | EW2304326-017     | EW2304326-018     | EW2304326-019     | EW2304326-020     |
|                     |            |        |                | Result            | Result            | Result            | Result            | Result            |
| Sampling Data       |            |        |                |                   |                   |                   |                   |                   |
| Transact / Location |            | -      | -              | D                 | D                 | D                 | E                 | E                 |
| Point               |            | -      | -              | 5                 | 6                 | 7                 | 1                 | 2                 |
| GPS North           |            | -      | -              | 6168194           | 6168174           | 6168145           | 6168142           | 6168151           |
| GPS East            |            | -      | -              | 30288             | 302401            | 302400            | 302373            | 302374            |
| CH4 Conc (ppm)      |            | -      | ppm            | 0.9               | 1.0               | 0.6               | 6.0               | 1.6               |



| Sub-Matrix: GAS     |            |        | Sample ID      | E                 | E                 | E                 | E                 | E                 |
|---------------------|------------|--------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                     |            |        |                | 3                 | 4                 | 5                 | 6                 | 7                 |
|                     |            | Sampli | ng date / time | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 |
| Compound            | CAS Number | LOR    | Unit           | EW2304326-021     | EW2304326-022     | EW2304326-023     | EW2304326-024     | EW2304326-025     |
|                     |            |        |                | Result            | Result            | Result            | Result            | Result            |
| Sampling Data       |            |        |                |                   |                   |                   |                   |                   |
| Transact / Location |            | -      | -              | E                 | E                 | E                 | E                 | E                 |
| Point               |            | -      | -              | 3                 | 4                 | 5                 | 6                 | 7                 |
| GPS North           |            | -      | -              | 6168164           | 6168176           | 6168184           | 6168196           | 6168222           |
| GPS East            |            | -      | -              | 302372            | 302377            | 302374            | 302371            | 302372            |
| CH4 Conc (ppm)      |            | -      | ppm            | 2.1               | 0.0               | 0.0               | 0.0               | 0.0               |



| Sub-Matrix: GAS     |            |        | Sample ID      | E                 | F                 | F                 | F                 | F                 |
|---------------------|------------|--------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| (Matrix: GAS)       |            |        |                | 8                 | 1                 | 2                 | 3                 | 4                 |
|                     |            | Sampli | ng date / time | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 |
| Compound            | CAS Number | LOR    | Unit           | EW2304326-026     | EW2304326-027     | EW2304326-028     | EW2304326-029     | EW2304326-030     |
|                     |            |        |                | Result            | Result            | Result            | Result            | Result            |
| Sampling Data       |            |        |                |                   |                   |                   |                   |                   |
| Transact / Location |            | -      | -              | E                 | F                 | F                 | F                 | F                 |
| Point               |            | -      | -              | 8                 | 1                 | 2                 | 3                 | 4                 |
| GPS North           |            | -      | -              | 6168246           | 6168129           | 6168139           | 6168151           | 6168162           |
| GPS East            |            | -      | -              | 302371            | 302359            | 302351            | 302342            | 302329            |
| CH4 Conc (ppm)      |            | -      | ppm            | 0.0               | 5.5               | 5.5               | 1.7               | 0.7               |



| Sub-Matrix: GAS     |            |        | Sample ID      | F                 | G                 | G                 | G                 | G                 |
|---------------------|------------|--------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| (Matrix: GAS)       |            |        |                | 5                 | 1                 | 2                 | 3                 | 4                 |
|                     |            | Sampli | ng date / time | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 |
| Compound            | CAS Number | LOR    | Unit           | EW2304326-031     | EW2304326-032     | EW2304326-033     | EW2304326-034     | EW2304326-035     |
|                     |            |        |                | Result            | Result            | Result            | Result            | Result            |
| Sampling Data       |            |        |                |                   |                   |                   |                   |                   |
| Transact / Location |            | -      | -              | F                 | G                 | G                 | G                 | G                 |
| Point               |            | -      | -              | 5                 | 1                 | 2                 | 3                 | 4                 |
| GPS North           |            | -      | -              | 6168174           | 6168404           | 6168423           | 6168444           | 6168465           |
| GPS East            |            | -      | -              | 302327            | 302245            | 302296            | 302324            | 302362            |
| CH4 Conc (ppm)      |            | -      | ppm            | 0.0               | 0.1               | 0.1               | 0.0               | 0.0               |



| Sub-Matrix: GAS<br>(Matrix: GAS) |            |        | Sample ID      | H<br>1            | H<br>2                | H<br>3            | H                 | H<br>5            |
|----------------------------------|------------|--------|----------------|-------------------|-----------------------|-------------------|-------------------|-------------------|
|                                  |            | Sampli | ng date / time | 20-Sep-2023 00:00 | <br>20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 |
| Compound                         | CAS Number | LOR    | Unit           | EW2304326-036     | EW2304326-037         | EW2304326-038     | EW2304326-039     | EW2304326-040     |
|                                  |            |        |                | Result            | Result                | Result            | Result            | Result            |
| Sampling Data                    |            |        |                |                   |                       |                   |                   |                   |
| Transact / Location              |            | -      | -              | Н                 | Н                     | н                 | Н                 | Н                 |
| Point                            |            | -      | -              | 1                 | 2                     | 3                 | 4                 | 5                 |
| GPS North                        |            | -      | -              | 6168335           | 6168291               | 6168232           | 6168200           | 6168166           |
| GPS East                         |            | -      | -              | 302551            | 302542                | 302552            | 302578            | 302592            |
| CH4 Conc (ppm)                   |            | -      | ppm            | 0.1               | 0.4                   | 0.2               | 0.6               | 0.0               |



| Sub-Matrix: GAS     |            |        | Sample ID      | н                 | н                 | н                 | н                 | н                 |
|---------------------|------------|--------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| (Matrix: GAS)       |            |        |                | 6                 | 7                 | 8                 | 9                 | 10                |
|                     |            | Sampli | ng date / time | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 |
| Compound            | CAS Number | LOR    | Unit           | EW2304326-041     | EW2304326-042     | EW2304326-043     | EW2304326-044     | EW2304326-045     |
|                     |            |        |                | Result            | Result            | Result            | Result            | Result            |
| Sampling Data       |            |        |                |                   |                   |                   |                   |                   |
| Transact / Location |            | -      | -              | Н                 | Н                 | н                 | Н                 | Н                 |
| Point               |            | -      | -              | 6                 | 7                 | 8                 | 9                 | 10                |
| GPS North           |            | -      | -              | 6168117           | 6168086           | 6168069           | 6168091           | 6168125           |
| GPS East            |            | -      | -              | 302630            | 302625            | 302601            | 302582            | 302563            |
| CH4 Conc (ppm)      |            | -      | ppm            | 0.1               | 0.0               | 0.1               | 1.3               | 1.8               |

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|------------|--|
| Work Order | : EW2304326                                  |
| Client     | : SHELLHARBOUR CITY COUNCIL                  |
| Project    | <ul> <li>Dunmore Landfill Methane</li> </ul> |



| Sub-Matrix: GAS<br>(Matrix: GAS) |            |        | Sample ID      | H<br>11           | H<br>12           | H<br>13           | H<br>14           | H<br>15           |
|----------------------------------|------------|--------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                                  |            | Sampli | ng date / time | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 |
| Compound                         | CAS Number | LOR    | Unit           | EW2304326-046     | EW2304326-047     | EW2304326-048     | EW2304326-049     | EW2304326-050     |
|                                  |            |        |                | Result            | Result            | Result            | Result            | Result            |
| Sampling Data                    |            |        |                |                   |                   |                   |                   |                   |
| Transact / Location              |            | -      | -              | Н                 | Н                 | н                 | Н                 | Н                 |
| Point                            |            | -      | -              | 11                | 12                | 13                | 14                | 15                |
| GPS North                        |            | -      | -              | 6168172           | 6167999           | 6168038           | 6168081           | 6168133           |
| GPS East                         |            | -      | -              | 302545            | 302500            | 302504            | 302514            | 302517            |
| CH4 Conc (ppm)                   |            | -      | ppm            | 0.3               | 1.0               | 0.0               | 0.0               | 0.0               |



| Sub-Matrix: GAS<br>(Matrix: GAS) |            |        | Sample ID      | H<br>16           | H<br>17           | H<br>18           | H<br>19           | H<br>20           |
|----------------------------------|------------|--------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                                  |            | Sampli | ng date / time | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 |
| Compound                         | CAS Number | LOR    | Unit           | EW2304326-051     | EW2304326-052     | EW2304326-053     | EW2304326-054     | EW2304326-055     |
|                                  |            |        |                | Result            | Result            | Result            | Result            | Result            |
| Sampling Data                    |            |        |                |                   |                   |                   |                   |                   |
| Transact / Location              |            | -      | -              | Н                 | Н                 | н                 | Н                 | Н                 |
| Point                            |            | -      | -              | 16                | 17                | 18                | 19                | 20                |
| GPS North                        |            | -      | -              | 6168172           | 6168235           | 6168291           | 6168383           | 6168432           |
| GPS East                         |            | -      | -              | 302520            | 302525            | 302535            | 302547            | 302517            |
| CH4 Conc (ppm)                   |            | -      | ppm            | 0.4               | 0.1               | 0.0               | 0.0               | 0.0               |

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|------------|--|
| Work Order | : EW2304326                                  |
| Client     | : SHELLHARBOUR CITY COUNCIL                  |
| Project    | <ul> <li>Dunmore Landfill Methane</li> </ul> |



| Sub-Matrix: GAS<br>(Matrix: GAS) |                     |        | Sample ID      | H<br>21           | H<br>22           | H<br>23           | H<br>24           | H<br>25           |
|----------------------------------|---------------------|--------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                                  |                     | Sampli | ng date / time | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 |
| Compound                         | CAS Number LOR Unit |        | Unit           | EW2304326-056     | EW2304326-057     | EW2304326-058     | EW2304326-059     | EW2304326-060     |
|                                  |                     |        |                | Result            | Result            | Result            | Result            | Result            |
| Sampling Data                    |                     |        |                |                   |                   |                   |                   |                   |
| Transact / Location              |                     | -      | -              | н                 | Н                 | н                 | Н                 | Н                 |
| Point                            |                     | -      | -              | 21                | 22                | 23                | 24                | 25                |
| GPS North                        |                     | -      | -              | 6168453           | 6168473           | 6168482           | 6168497           | 6168485           |
| GPS East                         |                     | -      | -              | 302490            | 302471            | 302467            | 302446            | 302420            |
| CH4 Conc (ppm)                   |                     | -      | ppm            | 0.1               | 0.0               | 0.0               | 0.0               | 0.0               |



| Sub-Matrix: GAS<br>(Matrix: GAS) |                     |        | Sample ID      | H<br>26           | H<br>27           | H<br>28           | H<br>29           | H<br>30           |
|----------------------------------|---------------------|--------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                                  |                     | Sampli | ng date / time | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 |
| Compound                         | CAS Number LOR Unit |        | Unit           | EW2304326-061     | EW2304326-062     | EW2304326-063     | EW2304326-064     | EW2304326-065     |
|                                  |                     |        |                | Result            | Result            | Result            | Result            | Result            |
| Sampling Data                    |                     |        |                |                   |                   |                   |                   |                   |
| Transact / Location              |                     | -      | -              | Н                 | н                 | н                 | н                 | н                 |
| Point                            |                     | -      | -              | 26                | 27                | 28                | 29                | 30                |
| GPS North                        |                     | -      | -              | 6168486           | 6168452           | 6168393           | 6168346           | 6168287           |
| GPS East                         |                     | -      | -              | 302354            | 302279            | 302213            | 302167            | 302111            |
| CH4 Conc (ppm)                   |                     | -      | ppm            | 0.0               | 0.0               | 0.0               | 0.0               | 0.0               |



| Sub-Matrix: GAS<br>(Matrix: GAS) |                     |        | Sample ID      | H<br>31           | H<br>32           | H<br>33           | H<br>34           | H<br>35           |
|----------------------------------|---------------------|--------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                                  |                     | Sampli | ng date / time | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 |
| Compound                         | CAS Number LOR Unit |        |                | EW2304326-066     | EW2304326-067     | EW2304326-068     | EW2304326-069     | EW2304326-070     |
|                                  |                     |        |                | Result            | Result            | Result            | Result            | Result            |
| Sampling Data                    |                     |        |                |                   |                   |                   |                   |                   |
| Transact / Location              |                     | -      | -              | н                 | Н                 | н                 | Н                 | Н                 |
| Point                            |                     | -      | -              | 31                | 32                | 33                | 34                | 35                |
| GPS North                        |                     | -      | -              | 6168231           | 6168133           | 6168041           | 6167993           | 6167950           |
| GPS East                         |                     | -      | -              | 302076            | 302067            | 302099            | 302144            | 302183            |
| CH4 Conc (ppm)                   |                     | -      | ppm            | 0.0               | 0.0               | 0.0               | 5.3               | 0.2               |


| Sub-Matrix: GAS<br>(Matrix: GAS) |            |        | Sample ID      | H<br>36           | H<br>37           | H<br>38           |                   | <br>2         |
|----------------------------------|------------|--------|----------------|-------------------|-------------------|-------------------|-------------------|---------------|
|                                  |            | Sampli | ng date / time | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 |               |
| Compound                         | CAS Number | LOR    | Unit           | EW2304326-071     | EW2304326-072     | EW2304326-073     | EW2304326-074     | EW2304326-075 |
|                                  |            |        |                | Result            | Result            | Result            | Result            | Result        |
| Sampling Data                    |            |        |                |                   |                   |                   |                   |               |
| Transact / Location              |            | -      | -              | Н                 | Н                 | н                 | I                 | I             |
| Point                            |            | -      | -              | 36                | 37                | 38                | 1                 | 2             |
| GPS North                        |            | -      | -              | 6167889           | 6167878           | 6167900           | 6168150           | 6168166       |
| GPS East                         |            | -      | -              | 302254            | 302370            | 302464            | 302088            | 302125        |
| CH4 Conc (ppm)                   |            | -      | ppm            | 0.0               | 0.0               | 0.0               | 0.0               | 0.0           |

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|------------|--|
| Work Order | : EW2304326                                  |
| Client     | : SHELLHARBOUR CITY COUNCIL                  |
| Project    | <ul> <li>Dunmore Landfill Methane</li> </ul> |



| Sub-Matrix: GAS<br>(Matrix: GAS) |            |        | Sample ID      | <br>3             | l<br>4            | J<br>1            | J<br>2            | J<br>3            |
|----------------------------------|------------|--------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                                  |            | Sampli | ng date / time | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 |
| Compound                         | CAS Number | LOR    | Unit           | EW2304326-076     | EW2304326-077     | EW2304326-078     | EW2304326-079     | EW2304326-080     |
|                                  |            |        |                | Result            | Result            | Result            | Result            | Result            |
| Sampling Data                    |            |        |                |                   |                   |                   |                   |                   |
| Transact / Location              |            | -      | -              | I                 | I                 | J                 | J                 | J                 |
| Point                            |            | -      | -              | 3                 | 4                 | 1                 | 2                 | 3                 |
| GPS North                        |            | -      | -              | 6168182           | 6168199           | 6168197           | 6168217           | 6168240           |
| GPS East                         |            | -      | -              | 302157            | 302237            | 302255            | 302249            | 302239            |
| CH4 Conc (ppm)                   |            | -      | ppm            | 0.1               | 0.0               | 0.0               | 0.0               | 0.0               |



| Sub-Matrix: GAS<br>(Matrix: GAS) |            |        | Sample ID      | J                 | J                 | K<br>1            | к                 | K                 |
|----------------------------------|------------|--------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                                  |            |        |                | +                 | 3                 | 1                 | 2                 | 5                 |
|                                  |            | Sampli | ng date / time | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 |
| Compound                         | CAS Number | LOR    | Unit           | EW2304326-081     | EW2304326-082     | EW2304326-083     | EW2304326-084     | EW2304326-085     |
|                                  |            |        |                | Result            | Result            | Result            | Result            | Result            |
| Sampling Data                    |            |        |                |                   |                   |                   |                   |                   |
| Transact / Location              |            | -      | -              | J                 | J                 | К                 | К                 | К                 |
| Point                            |            | -      | -              | 4                 | 5                 | 1                 | 2                 | 3                 |
| GPS North                        |            | -      | -              | 6168257           |                   | 6168516           | 6168537           | 6168577           |
| GPS East                         |            | -      | -              | 302233            |                   | 302391            | 302445            | 302454            |
| CH4 Conc (ppm)                   |            | -      | ppm            | 0.0               |                   | 0.0               | 0.0               | 0.0               |
| Comments                         |            | -      | -              |                   | WORKS IN PROGRESS |                   |                   |                   |

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| Work Order | : EW2304326                                  |
| Client     | : SHELLHARBOUR CITY COUNCIL                  |
| Project    | <ul> <li>Dunmore Landfill Methane</li> </ul> |



| Sub-Matrix: GAS<br>(Matrix: GAS) |            |        | Sample ID      | К<br>4            | K<br>5            | L<br>1            | L<br>2            | L<br>3            |
|----------------------------------|------------|--------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|                                  |            | Sampli | ng date / time | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 |
| Compound                         | CAS Number | LOR    | Unit           | EW2304326-086     | EW2304326-087     | EW2304326-088     | EW2304326-089     | EW2304326-090     |
|                                  |            |        |                | Result            | Result            | Result            | Result            | Result            |
| Sampling Data                    |            |        |                |                   |                   |                   |                   |                   |
| Transact / Location              |            | -      | -              | К                 | К                 | L                 | L                 | L                 |
| Point                            |            | -      | -              | 4                 | 5                 | 1                 | 2                 | 3                 |
| GPS North                        |            | -      | -              | 6168583           | 6168549           | 6168735           | 6168682           | 6168627           |
| GPS East                         |            | -      | -              | 302395            | 302376            | 302327            | 302278            | 302244            |
| CH4 Conc (ppm)                   |            | -      | ppm            | 0.1               | 0.0               | 0.1               | 0.0               | 0.0               |

| Page       | : 21 of 23                                   |
|------------|--|
| Work Order | : EW2304326                                  |
| Client     | : SHELLHARBOUR CITY COUNCIL                  |
| Project    | <ul> <li>Dunmore Landfill Methane</li> </ul> |



| Sub-Matrix: GAS<br>(Matrix: GAS) |            |        | Sample ID      | L<br>4            | L<br>5            | L<br>6            | Compressor Shed<br>1 | Office<br>1       |
|----------------------------------|------------|--------|----------------|-------------------|-------------------|-------------------|----------------------|-------------------|
|                                  |            | Sampli | ng date / time | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00 | 20-Sep-2023 00:00    | 20-Sep-2023 00:00 |
| Compound                         | CAS Number | LOR    | Unit           | EW2304326-091     | EW2304326-092     | EW2304326-093     | EW2304326-094        | EW2304326-095     |
|                                  |            |        |                | Result            | Result            | Result            | Result               | Result            |
| Sampling Data                    |            |        |                |                   |                   |                   |                      |                   |
| Transact / Location              |            | -      | -              | L                 | L                 | L                 | Compressor Shed      | Office            |
| Point                            |            | -      | -              | 4                 | 5                 | 6                 | 1                    | 1                 |
| GPS North                        |            | -      | -              | 6168582           | 6168559           | 6168507           |                      |                   |
| GPS East                         |            | -      | -              | 302214            | 302186            | 302153            |                      |                   |
| CH4 Conc (ppm)                   |            | -      | ppm            | 0.0               | 0.0               | 0.0               | 1.9                  | 0.1               |



| Sub-Matrix: GAS<br>(Matrix: GAS) |            |        | Sample ID      | Community Recycling<br>Centre<br>1 | OLD Weighbridge<br>1 | OLD Weighbridge<br>Toilet<br>1 | Revolve Shop<br>1 | Building Truckwash<br>1 |
|----------------------------------|------------|--------|----------------|------------------------------------|----------------------|--------------------------------|-------------------|-------------------------|
|                                  |            | Sampli | ng date / time | 20-Sep-2023 00:00                  | 20-Sep-2023 00:00    | 20-Sep-2023 00:00              | 20-Sep-2023 00:00 | 20-Sep-2023 00:00       |
| Compound                         | CAS Number | LOR    | Unit           | EW2304326-096                      | EW2304326-097        | EW2304326-098                  | EW2304326-099     | EW2304326-100           |
|                                  |            |        |                | Result                             | Result               | Result                         | Result            | Result                  |
| Sampling Data                    |            |        |                |                                    |                      |                                |                   |                         |
| Transact / Location              |            | -      | -              | Community                          | OLD Weighbridge      | OLD Weighbridge                | Revolve Shop      | Building Truckwash      |
|                                  |            |        |                | Recycling Centre                   |                      | Toilet                         |                   |                         |
| Point                            |            | -      | -              | 1                                  | 1                    | 1                              | 1                 | 1                       |
| CH4 Conc (ppm)                   |            | -      | ppm            | 0.1                                | 0.0                  | 0.0                            | 0.0               | 0.0                     |



| Sub-Matrix: GAS     |            |        | Sample ID      | New Weighbridge   | Methane Blank      | Methane Blank       | <br> |
|---------------------|------------|--------|----------------|-------------------|--------------------|---------------------|------|
| (Matrix: GAS)       |            |        |                | 1                 | Pre Reading - Main | Post Reading - Main |      |
|                     |            |        |                |                   | Gate               | Gate                |      |
|                     |            | Sampli | ng date / time | 20-Sep-2023 00:00 | 20-Sep-2023 00:00  | 20-Sep-2023 00:00   | <br> |
| Compound            | CAS Number | LOR    | Unit           | EW2304326-101     | EW2304326-102      | EW2304326-103       | <br> |
|                     |            |        |                | Result            | Result             | Result              | <br> |
| Sampling Data       |            |        |                |                   |                    |                     |      |
| Transact / Location |            | -      | -              | New Weighbridge   | Methane Blank      | Methane Blank       | <br> |
| Point               |            | -      | -              | 1                 | Pre testing Main   | Post testing Main   | <br> |
|                     |            |        |                |                   | Gate               | Gate                |      |
| CH4 Conc (ppm)      |            | -      | ppm            | 0.4               | 0.0                | 0.0                 | <br> |



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

CLIENT:

#### CHAIN OF CUSTODY

ALS Laboratory: please tick →

C Sydney: 277 Woodpark Rd. Smithfield NSW 2176 Ph: 02 8784 8555 Elsamples sydnay@alsenviro.com C Newcastle: 5 Rosegum Rd. Warabrook NSW 2304

 Brisbane: 32 Shand St. Stafford QLO 4053
 Ph:07 3243 7222 E:samples brisbane@alsenviro.com Townsville: 14-15 Desma Ct. Bohle GLD 4818 LI Newcastle: 5 Nosegum Nd. Warabrook NSW 2304 LI Townsville: 14-15 Desma Ct, Bohte OLD 4318 Ph.02 4968 9433 Eisamples.newcastle@alsertvio.com Ph.07 4796 0600 Ei townsville.astronnartei@alsertvio.com

Cl Melbourne: 2-4 Westall Rd. Springvale VIC 3171 Ph:03 8549 9660 E. samples,melbourne@alsenviro.com CL Adelaide: 2-1 Burma Rd. Pooraka SA 5005 Ph: 03 8359 0890 Etadelaide@alsenviro.com

II Perth: 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alserwiro.com Launceston: 27 Wellington St, Launceston TAS 7250
 Ph: 03 6331 2158 E. faunceston@alsenviro.com

| CLIENT: Shellharbour City Council OFFICE: PROJECT: Dunmore Landfill Overflows | TURNAROUND REQUIREMENTS :<br>(Standard TAT may be longer for some tests<br>e.g., Ultra Trace Organics)<br>ALS QUOTE NO. | El townswile-entronnansi@ulleen.wo.com Ph: 03     Standard TAT (List due date):     Non Standard or urgent TAT (List du | i 8359 0890 Earlelaide@alsenvio.com | Laurceston: 27 Wellington St, Laurceston<br>Ph: 03 6331 2158 E. laurceston@alsenviro.cc<br>FOR LABORATORY USE CONL<br>Costody Sed Integra | TAS 7250<br>m                    |
|---|---|---|-------------------------------------|---|----------------------------------|
| ORDER NUMBER:   | W0/030/19 TEN   | DER   | COC SEQUENCE NUMBER (Circle         | Free ice / frozen ice bricks present in   |                                  |
| PROJECT MANAGER: Ryan Stirling  |   |   | coc: 1 2 3 + 4 5 6                  | 7 Patrice Service   | " (Yes) No. NA                   |
| SAMPLER: Robert Dalus SAM   | PLER MOBILE:  | RELINQUISHED BY:  | OF: 1 2 3 4 5 6                     | 7 Other comment:  | <sup>cent</sup> 7·2 <sup>c</sup> |
| Email Reports to :  | FORMAT (or default):  | Robat Delis   | RECEIVED BY:                        | RELINQUISHED BY:  | RECEIVED BY:                     |
| Email Invoice to :  |   |   | DATE/TIME:                          |   |                                  |
| COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: CC repo                        | Drts to:  | 15.3.23   | 13.3.23                             |   | IDATE/TIME:                      |
|   |   |   |                                     |   |                                  |

|  | MATRIX: Sc   | Did(S) Water(W)                   |                | CONTAINER INFORMATION                         |                  |     | 'SIS REQU<br>• Metals are re | Additional Information |   |          |  |              |  |
|--|--|-----------------------------------|----------------|---|------------------|-----|------------------------------|------------------------|---|----------|--|--------------|--|
| LAB ID   | SAMPLE ID  | DATE / TIME                       | MATRIX         | TYPE & PRESERVATIVE<br>(refer to codes below) | TOTAL<br>BOTTLES |     |                              |                        |   |          |  |              | Comments on likely contaminant levels<br>dilutions, or samples requiring specific<br>analysis etc. |
| s  | SWP1 1/2 . 2   | 20 01 5                           |                |   | +                | TSS | Ha                           |                        |   |          |  |              |  |
|  |  | 42 4:13                           |                |   | +                |     | 1                            |                        |   |          |  |              | elt 7.57   |
|  |  |                                   |                |   |                  |     |                              | .<br>                  | + | <u> </u> |  |              | <u>&gt;/</u>   |
|  |  |                                   |                |   | +                |     |                              |                        |   | ·        |  |              |  |
|  |  |                                   |                |   |                  |     |                              |                        |   | <u> </u> |  |              |  |
|  |  |                                   |                |   |                  |     |                              |                        |   |          |  | Envi<br>Wolk | onmental Division  |
|  |  |                                   |                |   | <u> </u>         |     |                              |                        |   |          |  | E            | rk Order Reference   |
|  |  |                                   |                |   | ┼───┼-           |     |                              |                        |   |          |  |              |  |
|  |  |                                   |                |   |                  |     |                              |                        |   |          |  | <u> </u>     |  |
|  |  |                                   |                |   |                  |     |                              |                        |   |          |  |              |  |
| ntainer Codes: P = U<br>/ial HCI Preserved: VB | npreserved Plastic; N = Nitric Preserved F<br>= VOA Vial Sodium Bioulobata D | Plastic; ORC = Nitric Preserved O | IRC; SH = Sodi | TOTAL   | 10               |     | _                            |                        |   |          |  | Telephone    | : 02 42253125  |



## **CERTIFICATE OF ANALYSIS**

| Work Order              | EW2301202                                     | Page                    | : 1 of 2   |
|-------------------------|---|-------------------------|--|
| Client                  | SHELLHARBOUR CITY COUNCIL                     | Laboratory              | Environmental Division NSW South Coast                     |
| Contact                 | : Joel Coulton                                | Contact                 | : Aneta Prosaroski   |
| Address                 | : LAMERTON HOUSE, LAMERTON CRESCENT           | Address                 | : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia |
|                         | SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529 |                         |  |
| Telephone               | :   | Telephone               | : +61 2 4225 3125  |
| Project                 | : Dunmore Landfill Overflows                  | Date Samples Received   | : 13-Mar-2023 15:46  |
| Order number            | : 147649                                      | Date Analysis Commenced | : 13-Mar-2023  |
| C-O-C number            | :   | Issue Date              | 21-Mar-2023 15:20  |
| Sampler                 | : , Robert DaLio                              |                         | Hac-MRA NATA   |
| Site                    | :   |                         |  |
| Quote number            | : WO/030/19 TENDER OVERFLOW DISCHARGE         |                         | Accordition No. 825  |
| No. of samples received | : 1   |                         | Accredited for compliance with                             |
| No. of samples analysed | :1  |                         | ISO/IEC 17025 - Testing                                    |

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

#### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| Signatories      | Position                              | Accreditation Category             |
|------------------|---------------------------------------|------------------------------------|
| Aneta Prosaroski | Environmental Services Representative | Laboratory - Wollongong, NSW       |
| Wisam Marassa    | Inorganics Coordinator                | Sydney Inorganics, Smithfield, NSW |



#### **General Comments**

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

 $\sim$  = Indicates an estimated value.

• Analytical work for this work order will be conducted at ALS Sydney.

#### **Analytical Results**

| Sub-Matrix: WATER                      |             |        | Sample ID      | SWP1              | <br> | <br> |
|--|-------------|--------|----------------|-------------------|------|------|
| (Matrix: WATER)                        |             |        |                | Point 1           |      |      |
|  |             | Sampli | ng date / time | 13-Mar-2023 09:15 | <br> | <br> |
| Compound                               | CAS Number  | LOR    | Unit           | EW2301202-001     | <br> | <br> |
|  |             |        |                | Result            | <br> | <br> |
| EA005FD: Field pH                      |             |        |                |                   |      |      |
| рН                                     |             | 0.1    | pH Unit        | 7.6               | <br> | <br> |
| EA025: Total Suspended Solids dried at | t 104 ± 2°C |        |                |                   |      |      |
| Suspended Solids (SS)                  |             | 5      | mg/L           | 7                 | <br> | <br> |

#### Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) EA025: Total Suspended Solids dried at 104  $\pm$  2°C



Sydney: 277 Woodpark Rd. Smithfield NSW 2176
 Ph: 02 8784 8555 E.samptes.sydney@alsenviro.com
 Ph: 02 966 9433 E.samptes.rev.astrock NSW 2304
 Ph: 02 966 9433 E.samptes.rev.astrockenalserviro.com
 Ph: 02 966 9433 E.samptes.rev.astrockenalserviro.com

Brisbane 32 Shand St. Stafford QLD 4053
 Ph07 3245 7222 Esamples.brisbane@aiserwine.com
 Townsville: 14-15 Desma Ct. Bohle QLD 4818
 Ph07 4796 0600 E: tewnsville antionmental@atemvine.com

Melbourne: 2-4 Westall Rd, Springvale VIC 3171
Ph:03 8849 9600 E. samples melbourne@aleenviro.com
 Adelaide: 2-1 Burna Rd, Pooraka SA 5095
Ph:08 5359 0290 Eadelaide@aleenviro.com

El Perth. 10 Hod Way, Maiaga WA 6090 Ph: 08 9209 7655 E samplas,perth@alsonwiro.com El Laurceston: 27 Wellington St, Laurcestor TAS 7250 Ph: 03 8371 2156 E: laurcestor@alsonwiro.com

| CLIENT:                  | Shellharbour City Council                    |                                    | TURNAR                         | DUND REQUIREMENTS : Standard TAT (Lis                                | t due date)   | :                             |               |  | FOR LABORAT  | ORYUSE                                   | ONLY (Circle)  |
|--------------------------|--|------------------------------------|--------------------------------|--|---------------|-------------------------------|---------------|--|--|--|--|
| OFFICE:                  | 41 Burelli St WOLLONGONG NSW                 | 2500                               | (Standard TA<br>e.g., Ultra Tr | T may be longer for some tests  ace Organics) Non Standard or u      | rgent TAT (   | List due date)                | ):            |  | Custody Seel little  | v 👘                                      | Cres No NA   |
| PROJECT:                 | Testing                                      | SWP01 Overflow full                | ALS QUO                        | TE NO.: WO/030/19 TENDER   |               |                               | COC SEQU      | ENCE NUMBER (  | Circle) Free ice Afrozen ic<br>receipt?  | e bricks prese                           | nt upon Yes No N/A   |
| ORDER NUMBER:            |  |                                    |                                |  |               | COC:                          | 1 2           | 3 4 5  | 6 7 Random Sample 1  | emperature o                             | n Receipt. 🥣 to  |
| PROJECT MANAGER:         | Joel Culton                                  |                                    |                                |  |               | OF:                           | 1 2           | 3 4 5  | 6 7 Other comment  |  | 52   |
| SAMPLER: Michae          | el Santas                                    | SAMPLER N                          | IOBILE: C                      | 403520 891 RELINQUISHED BY:  |               | REC                           | EIVED BY:     |  | RELINQUISHED BY:   |  | RECEIVED BY:   |
| COC emailed to ALS?      | (YES / NO)                                   | EDD FORM                           | AT (or defau                   | It): Michael San   | hon .         | 4                             | ret           | a  |  |  |  |
| Email Reports to :       |  |                                    | -                              | DATE/TIME:   | -             | DATE                          |               |  | DATE/TIME:   |  | DATE/TIME:   |
| Email Invoice to :       |  |                                    |                                | pi-05-23   |               | <u>36</u>                     | 1/5,          | 123  |  |  |  |
| COMMENTS/SPECIAL         | HANDLING/STORAGE OR DISPOSA                  | L: CC reports to                   | :                              |  |               |                               |               |  |  |  | ÷ .  |
| ALS USE ONLY             | SAMPLE<br>MATRIX: So                         | E DETAILS<br>lid(S) Water(W)       |                                | CONTAINER INFORMATION  | ANALY         | YSIS REQUIR                   | RED includir  | <b>g SUITES</b> (NB. Si<br>al (unfiltered bottle req | uite Codes must be listed to attract<br>uired) or Dissolved (field filtered bottle | : suite price)<br>required).             | Additional Information   |
|                          | SAMDLE ID                                    |                                    | MATDIX                         | TYPE & PRESERVATIVE TOTAL  |               | (1)                           | 43, Total Mn  | d Total Fe   |  |  | Comments on likely contaminant levels,<br>dilutions, or samples requiring specific QC<br>analysis etc. |
|                          | SAMPLEID                                     | DATE / TIME                        | MAIRIX                         | (refer to codes below) BOTTLES                                       | TSS           | NT-1, NT-2A<br>(Ionic Balance | TOC, NT-4, NF | Dissolved and  |  |  |  |
|                          | SWP1   | 1.5-23 12:47                       | w                              |  | 1             | 1                             | 1             | ×  |  |  | Field Tests - pH, EC, DO & Temp  |
| :                        |  |                                    |                                |  |               |                               |               |  |  | 1  |  |
|                          |  |                                    |                                |  |               |                               |               |  |  |  |  |
|                          |  |                                    |                                |  |               | ~                             |               |  | Environme<br>Wollongon<br>Work Orde<br>EW2   | ntal Div<br>g<br>r Referen<br><b>301</b> | nce<br>940   |
|                          |  |                                    |                                |  |               |                               | •             |  |  |  |  |
|                          |  |                                    |                                | •  |               |                               |               |  |  |  |  |
|                          |  |                                    |                                |  |               |                               |               |  | Telephone : 02 42:   | 253125                                   | :<br>  |
| Water Container Codes: 1 | P = Unpreserved Plastic; N = Nitric Preserve | ad Plastic; CRC = Nitric Preserved | 1 ORC; SH = 1                  | TOTAL 10<br>Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Pres | erved Plastic | ; AG = Amber G                | Blass Unprese | ved; AP - Airfreight                                 | Unpreserved Plastic  |  | :  |

V = VOA Vial HCI Preserved VB = VOA Vial Solum Bisulphate Preserved; VS = VOA Vial Solum Bisulphate Preserved; VS = VOA Vial Solum Creserved; VS = VOA Vial Solution Creserved;



# **CERTIFICATE OF ANALYSIS**

| Work Order              | EW2301940                                     | Page                    | : 1 of 5   |
|-------------------------|---|-------------------------|--|
| Client                  | SHELLHARBOUR CITY COUNCIL                     | Laboratory              | Environmental Division NSW South Coast                     |
| Contact                 | : Ryan Stirling                               | Contact                 | : Aneta Prosaroski   |
| Address                 | : LAMERTON HOUSE, LAMERTON CRESCENT           | Address                 | : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia |
|                         | SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529 |                         |  |
| Telephone               | ·   | Telephone               | : +61 2 4225 3125  |
| Project                 | : Dunmore Surface Water SWP01 Overflow        | Date Samples Received   | : 01-May-2023 13:38  |
| Order number            | : 147649                                      | Date Analysis Commenced | : 01-May-2023  |
| C-O-C number            | :   | Issue Date              | 08-May-2023 10:48  |
| Sampler                 | : Michael Santos                              |                         | Hac-MRA NAIA   |
| Site                    | : DUNMORE LANDFILL TENDER                     |                         |  |
| Quote number            | : WO/030/19 TENDER SURFACE WATER              |                         | The Contraction of the second                              |
| No. of samples received | : 1   |                         | Accreditation No. 825<br>Accredited for compliance with    |
| No. of samples analysed | : 1   |                         | ISO/IEC 17025 - Testing                                    |

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

#### Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| Signatories      | Position                              | Accreditation Category             |
|------------------|---------------------------------------|------------------------------------|
| Aneta Prosaroski | Environmental Services Representative | Laboratory - Wollongong, NSW       |
| Ankit Joshi      | Senior Chemist - Inorganics           | Sydney Inorganics, Smithfield, NSW |



#### **General Comments**

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

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Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- Analytical work for this work order will be conducted at ALS Sydney.
- As per QWI EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions Chloride, Alkalinity and Sulfate; and Major Cations Calcium, Magnesium, Potassium and Sodium.
   Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- Sample site SWP1 was not discharging at time of sampling.
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Temperature performed by ALS Wollongong via in-house method EA116 and EN67 PK.
- Dissolved oxygen (DO) performed by ALS Wollongong via in-house method EP025FD and EN67 PK.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.4 Lakes and Reservoirs
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.</li>



| Sub-Matrix: WATER<br>(Matrix: WATER)         |             |        | Sample ID      | SWP1<br>Point 1   | <br> | <br> |
|--|-------------|--------|----------------|-------------------|------|------|
|  |             | Sampli | ng date / time | 01-May-2023 12:47 | <br> | <br> |
| Compound                                     | CAS Number  | LOR    | Unit           | EW2301940-001     | <br> | <br> |
|  |             |        |                | Result            | <br> | <br> |
| EA005FD: Field pH                            |             |        |                |                   |      |      |
| рН   |             | 0.1    | pH Unit        | 7.6               | <br> | <br> |
| EA010FD: Field Conductivity                  |             |        |                |                   |      |      |
| Electrical Conductivity (Non<br>Compensated) |             | 1      | μS/cm          | 1240              | <br> | <br> |
| EA015: Total Dissolved Solids dried at       | 180 ± 5 °C  |        |                |                   |      |      |
| Total Dissolved Solids @180°C                |             | 10     | mg/L           | 654               | <br> | <br> |
| EA025: Total Suspended Solids dried a        | t 104 ± 2°C |        |                |                   |      |      |
| Suspended Solids (SS)                        |             | 5      | mg/L           | 9                 | <br> | <br> |
| EA045: Turbidity                             |             |        |                |                   |      |      |
| Turbidity                                    |             | 0.1    | NTU            | 4.5               | <br> | <br> |
| EA116: Temperature                           |             |        |                |                   |      |      |
| Temperature                                  |             | 0.1    | °C             | 19.5              | <br> | <br> |
| ED037P: Alkalinity by PC Titrator            |             |        |                |                   |      |      |
| Hydroxide Alkalinity as CaCO3                | DMO-210-001 | 1      | mg/L           | <1                | <br> | <br> |
| Carbonate Alkalinity as CaCO3                | 3812-32-6   | 1      | mg/L           | <1                | <br> | <br> |
| Bicarbonate Alkalinity as CaCO3              | 71-52-3     | 1      | mg/L           | 354               | <br> | <br> |
| Total Alkalinity as CaCO3                    |             | 1      | mg/L           | 354               | <br> | <br> |
| ED041G: Sulfate (Turbidimetric) as SO4       | 2- by DA    |        |                |                   |      |      |
| Sulfate as SO4 - Turbidimetric               | 14808-79-8  | 1      | mg/L           | 43                | <br> | <br> |
| ED045G: Chloride by Discrete Analyser        |             |        |                |                   |      |      |
| Chloride                                     | 16887-00-6  | 1      | mg/L           | 168               | <br> | <br> |
| ED093F: Dissolved Major Cations              |             |        |                |                   |      |      |
| Calcium                                      | 7440-70-2   | 1      | mg/L           | 59                | <br> | <br> |
| Magnesium                                    | 7439-95-4   | 1      | mg/L           | 27                | <br> | <br> |
| Sodium                                       | 7440-23-5   | 1      | mg/L           | 135               | <br> | <br> |
| Potassium                                    | 7440-09-7   | 1      | mg/L           | 14                | <br> | <br> |
| EG020F: Dissolved Metals by ICP-MS           |             |        |                |                   |      |      |
| Iron   | 7439-89-6   | 0.05   | mg/L           | 0.06              | <br> | <br> |
| EG020T: Total Metals by ICP-MS               |             |        |                |                   |      |      |
| Manganese                                    | 7439-96-5   | 0.001  | mg/L           | 0.184             | <br> | <br> |
| Iron   | 7439-89-6   | 0.05   | mg/L           | 0.32              | <br> | <br> |
| EK040P: Fluoride by PC Titrator              |             |        |                |                   |      |      |
| Fluoride                                     | 16984-48-8  | 0.1    | mg/L           | 0.3               | <br> | <br> |



| Sub-Matrix: WATER<br>(Matrix: WATER)      |                 |         | Sample ID      | SWP1<br>Point 1   | <br> | <br> |
|---|-----------------|---------|----------------|-------------------|------|------|
|   |                 | Samplii | ng date / time | 01-May-2023 12:47 | <br> | <br> |
| Compound                                  | CAS Number      | LOR     | Unit           | EW2301940-001     | <br> | <br> |
|   |                 |         |                | Result            | <br> | <br> |
| EK055G: Ammonia as N by Discrete Analy    | yser            |         |                |                   |      |      |
| Ammonia as N                              | 7664-41-7       | 0.01    | mg/L           | 0.04              | <br> | <br> |
| EK055G-NH4: Ammonium as N by DA           |                 |         |                |                   |      |      |
| Ammonium as N                             | 14798-03-9_N    | 0.01    | mg/L           | 0.04              | <br> | <br> |
| EK057G: Nitrite as N by Discrete Analyse  | ə <b>r</b>      |         |                |                   |      |      |
| Nitrite as N                              | 14797-65-0      | 0.01    | mg/L           | <0.01             | <br> | <br> |
| EK058G: Nitrate as N by Discrete Analyse  | er              |         |                |                   |      |      |
| Nitrate as N                              | 14797-55-8      | 0.01    | mg/L           | <0.01             | <br> | <br> |
| EK059G: Nitrite plus Nitrate as N (NOx) b | oy Discrete Ana | lyser   |                |                   |      |      |
| Nitrite + Nitrate as N                    |                 | 0.01    | mg/L           | <0.01             | <br> | <br> |
| EN055: Ionic Balance                      |                 |         |                |                   |      |      |
| Ø Total Anions                            |                 | 0.01    | meq/L          | 12.7              | <br> | <br> |
| Ø Total Cations                           |                 | 0.01    | meq/L          | 11.4              | <br> | <br> |
| Ø Ionic Balance                           |                 | 0.01    | %              | 5.44              | <br> | <br> |
| EP005: Total Organic Carbon (TOC)         |                 |         |                |                   |      |      |
| Total Organic Carbon                      |                 | 1       | mg/L           | 281               | <br> | <br> |
| EP025FD: Field Dissolved Oxygen           |                 |         |                |                   |      |      |
| Dissolved Oxygen                          |                 | 0.01    | mg/L           | 6.77              | <br> | <br> |



#### Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) EA045: Turbidity (WATER) EP005: Total Organic Carbon (TOC) (WATER) EG020F: Dissolved Metals by ICP-MS (WATER) EG020T: Total Metals by ICP-MS (WATER) EK057G: Nitrite as N by Discrete Analyser (WATER) EK058G: Nitrate as N by Discrete Analyser (WATER) EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (WATER) EA025: Total Suspended Solids dried at 104 ± 2°C (WATER) EK055G-NH4: Ammonium as N by DA (WATER) EK055G: Ammonia as N by Discrete Analyser (WATER) EN055: Ionic Balance (WATER) ED045G: Chloride by Discrete Analyser (WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (WATER) EK040P: Fluoride by PC Titrator (WATER) ED037P: Alkalinity by PC Titrator (WATER) ED093F: Dissolved Major Cations (WATER) EA015: Total Dissolved Solids dried at 180 ± 5 °C



Appendix I: Calibration Certificates

| number                   | 2200    | 22WO    | 22WO   | 0010           |       | 22WO    |           | 22WO<br>1012 |             | 2WO<br>2013      |                    |         |         |           | 821)<br>81-1 | 22   | 22            | 22    | 21/00     | 21/00                  | 21/00     |                      |
|--------------------------|---------|---------|--------|----------------|-------|---------|-----------|--------------|-------------|------------------|--------------------|---------|---------|-----------|--------------|------|---------------|-------|-----------|------------------------|-----------|----------------------|
| Operational Limits       | ± 0.1   | ± 0.1   | ± 0.1  | 7.15-7.25      |       | 79 - 88 | 142 - 151 | 1369 - 1454  | 700 - 10300 | 12493 -<br>13266 | 108446 -<br>115154 | / CRM   | <0.2    | 95 - 105% | 217 - 240    | S    | S             | SZ    | ± 0.09 52 | ± 0.10 <b>S</b> 2<br>1 | ± 0.14 S2 |                      |
| Certified Value          | 7.00    | 4.00    | 10.00  | pH<br>Junction | Chk S | 84      | 146.9     | 1412         | 10000 §     | 12880            | 11800              | Chk Sto | .0mg/L  | 100%      | 229          | NTU  | NTU           | NTU   | 0.24      | 0.95                   | 1.63      | Analyst/<br>Comments |
| Meter ID Date            |         |         | pН     |                |       |         |           | E            | (µS/cm      | 2                |                    |         |         |           | ORP          | Turt | idity (NT     |       | Chin      | rine (mo               |           |                      |
| ALSWOLD1602 12/11/22     | 20.7    | 4.02    | 10-01  |                | . 5   |         |           |              |             |                  |                    |         | (% or n | ng/L)     | (mV)         | - un | Diolity (IN I | 9     | Chio      | orine (mg.             | Ē         | 1                    |
| AI SWICE - 900 00 11140. |         |         | 200    | ī              | 121   |         |           |              |             |                  |                    |         |         |           |              |      |               |       |           |                        |           | de                   |
| ALSWOLDIN DUITO          | cat     | 4.06    | 241    | 141            | 229   |         |           |              |             |                  | 1                  |         |         |           |              |      |               |       |           |                        |           | Din                  |
| ALSWOLOULA 22 11/22      | 7.52    | 3.99    | 10.06  | 7/7            | 12.2  |         |           |              |             |                  | S                  | 0760    | 101     | · C hole  | 0            | 200  | 1012-1        | in bu | (14)      |                        |           | 101 C                |
| ALSWOLG732 23/11/24      | 698     | 3.90    | 6.98   | 121            | 24.3  |         | -         | 42           |             | 120195           | C                  |         | 63.2 1  | 3         |              |      |               |       | (200)     |                        |           | N21                  |
| ALSWOL 040 24/11/22      | 7.03    | 3.990   | 9.98   |                | 250:  |         |           |              |             |                  |                    |         | 0       | 0         |              |      |               |       |           |                        |           | Par C                |
| ALSWOLO(1, 25.11.21      | しい      | 423     | 10.01  |                | 23.3  |         |           |              |             |                  |                    |         |         |           |              |      |               |       |           |                        |           | Rent                 |
| ALSWOLDER 19-11-12       | 5.97    | 4.011   | 90.06  |                | 8.8   |         |           |              |             |                  |                    |         |         |           |              |      |               |       |           |                        |           | nd h                 |
| ALSWOLD 44.11.26         | 7.01    | 3.99.1  | 0.07   | 125            | 4.0   |         |           |              |             |                  |                    |         |         |           |              |      |               |       |           |                        |           | Cal                  |
| ALSWOL 24 30-11.22       | 702     | 4.01 1  | 0.04   | 1-17           | ð     |         |           |              |             |                  |                    |         |         |           |              |      |               |       |           |                        |           | RUL                  |
| ALSWOLSUL Soll. 20       | 7.04    | 4.04 1  | 800    | 7.19           | 12.0  |         | _         |              |             |                  |                    |         |         |           |              |      |               |       |           |                        |           | 200                  |
| ALSWOLD66Q 1.12.72       | 7.08    | 4.04 1  | 0.07   | 1              |       |         |           |              |             |                  |                    |         |         |           |              |      |               |       |           |                        |           | R2.                  |
| ALSWOLDDAL 1. 12.22      | .05     | 49.6    | A      | 1.23 2         | 2.0   |         | -         | 1            | -           | 1240             | -                  |         | 2       | Ì         |              |      |               |       |           |                        |           | MAS                  |
| LSWOLDILL & D. W2        | 1014    | 3,00    | 1.90   | 0 20           | 5.5   |         | 2         | i l          | E           | 1010             |                    |         | 1.0     | 8         |              |      |               |       |           |                        |           | Py2                  |
| LSWOL-660 2.12.2-        | 7.04    | 1.52 1  | D P    | 3              | 2.0   |         |           | 4            |             | 100              |                    | 10      | 2       | 00        |              |      |               |       |           |                        |           | pany                 |
| LSWOLD 2.12.7            | 1.06    | 424     | 1.95   | 0              | 27.7  |         |           |              |             |                  |                    |         |         |           |              |      |               |       |           |                        |           | RAN                  |
| LSWOL0260 5.12.22        | 7.02. 4 | 03 60 + | 10.04  | 1.200          | 101   |         |           | -            |             |                  |                    |         |         |           |              |      |               |       |           |                        |           | RM                   |
| LSWOLD662 5.12.22        | 1.02 (  | 1 co.t  | - 20.0 | 16 1           | S.A.  |         |           | -            |             |                  |                    |         |         |           |              |      |               |       |           |                        |           | MSV                  |
| LSWOL(-7)22 5.12.21      | 4.4     | 2.22 0  | 00     | 2              | 2.40  |         | -         | 1            | ~           | 22               |                    | 、<br>、  |         |           |              |      |               |       |           |                        |           | 8                    |
| LSWOL NUR GILVIL         | 702     | 4.021   | 70:0   |                | 1.2   |         | -         | f            |             | 797              |                    | 2       | 1 . T.  | 2         | 15           |      |               |       |           |                        |           | PM.                  |
| LSWOLGAD G.D. IL         | 5.95    | 3 55 0  | 198    | 2              | 4.50  |         | 1         | 45           | ~           | 193              |                    |         | -       | 2         | 20           |      |               |       |           |                        |           | der.                 |
| -SWOLDON 7. R.JU         |         |         |        |                | 6     | 2 2     | _         | 51           | -           |                  |                    | 0       | 1       | >         | 200          | -    |               |       |           | -                      |           | RN                   |
| LSWOL 522 7 12.26        | 5.97 4  | t.ool   | 1.94   | 12             | 23    |         | -         | 191          | -           | -                |                    |         | -       | +         | -            |      |               |       | -         |                        |           | N                    |
|                          | 1       | Tix     | 1.14   | *              | 1.4   | -       |           | -            | _           |                  |                    |         |         |           |              |      |               |       |           |                        |           |                      |

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Field Calibration Form



# **CERTIFICATE OF CALIBRATION**

Issued By: Ecotec Solutions, Inc.

Serial Number: 3810912

| Customer:                        | ANRI Instruments & Controls |                          |                   |
|----------------------------------|-----------------------------|--------------------------|-------------------|
| www.ecotecco.com                 |                             |                          |                   |
| Colton, CA 92324<br>909-906-1001 |                             | Certificate #:           | 202215023810912   |
| 850 S Via Lata, Suite 1          | 115                         | Recommended Calibration: | February 15, 2024 |
|                                  |                             |                          |                   |

Calibration Date:

February 15, 2022

*Calibration Results:* The analyzer is considered to be in conformity with the specifications of reference.

| Units | Gas             | Certified Gas<br>Concentration | Gas Traceability<br>(Lot Number) | Instrument<br>Reading | Tolerance |
|-------|-----------------|--------------------------------|----------------------------------|-----------------------|-----------|
| %     | N <sub>2</sub>  | 99.999                         | N70086009803                     | 0.2 PPM               | 5 PPM     |
| PPM   | CH <sub>4</sub> | 10.0 PPM                       | 70086129308                      | 9.9 PPM               | ± 10%     |
| PPM   | CH <sub>4</sub> | 500 PPM                        | 70086030712                      | 488.5 PPM             | ± 10%     |
| PPM   | CH4             | 2498 PPM                       | 70086811308                      | 2607.3 PPM            | ± 10%     |
| PPM   | CH <sub>4</sub> | 10000 PPM                      | 109631206                        | 10077.9 PPM           | ± 10%     |
| PPM   | CH <sub>4</sub> | 20000 PPM                      | 109631303                        | 20002.7 PPM           | ± 10%     |
| PPM   | CH <sub>4</sub> | 999700 PPM                     | MET-040918-UHP                   | 1003150 PPM           | ± 10%     |

Calibration Technician: Jose Munoz

Signature:

Date: February 15, 2022

This certificate is issued in accordance with laboratory requirements of the National Institute of Standards and Technology. It provides traceability of measurement to recognized national standards, and to units of measurement realized a t the National Institute of Standards and Technology or other recognized national standards laboratories. Certification only applies to results shown. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

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ECOTEC Solutions, Inc. Instrument Services Facility | 850 South Via Lata #115, Colton, CA 92324 | +1 (909) 906 1001

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|-----------------------------|-------------|-------------|-------|----------------|-------------------|---------|-----------|-------------|--------------|------------------|--------------------|---------|---------|-----------|-----------|------|-----------|--------|---------|-----------|----------|----------------------|
| Standard or Batch<br>number | 23WO<br>000 | 23WO<br>000 | 23WO  | 230            | 22W<br>22U<br>22W | 22WO    |           | 22WO        |              | 001              | 2200               | 130     |         |           | 128       | 522  | 522       | 522    | 521/00  | 21/00     | 21/00    |                      |
| Operational Limits          | ± 0.1       | ± 0.1       | ± 0.1 | 7.15-7.25      | td / CRM          | 79 - 88 | 142 - 151 | 1369 - 1454 | 9700 - 10300 | 12493 -<br>13266 | 108446 -<br>115154 | d / CRM | <0.2    | 95 - 105% | 217 - 240 |      |           | 5      | ± 0.09  | ± 0.10    | ± 0.14 1 |                      |
| Certified Value             | 7.00        | 4.00        | 10.00 | pH<br>Junction | Chk S             | 84      | 146.9     | 1412        | 10000        | 12880            | 111800             | Chk S   | 0.0mg/L | 100%      | 229       | NTU  | NTU       | NTU    | 0.24    | 0.95      | 1.63     | Analyst/<br>Comments |
| Meter ID Date               |             |             | рн    |                |                   |         |           | E           | C (µS/cn     | n)               |                    |         | (% or r | ng/L)     | (mV)      | Turb | idity (NT | S      | Chlo    | rine (mg/ | Ľ        | 4                    |
| LSWOL 060 17.2.23           | 7.03        | 4.02        | 85.6  |                | 7.04              |         |           |             |              | Pink             | E E                |         |         |           | •         |      |           |        |         |           |          | L 27                 |
| LSWOL OUL 20 2.23           | 7:02        | 4.01        | 5.45  | 7.17           | 7:04              |         |           |             |              | 12470            |                    | 100     | 8       | 21910     | bar       | 500  | 5         | 12 - 4 | L       |           |          | 10 14                |
| LSWOLS732 202.20            | 7.55        | 4.03        | 20.0  | 7.10           | 704               |         |           | 1419        |              | R.               | R                  | Sol C   | 202     | 102       |           | 1714 | (         |        | ALCO IN |           | -        | RM.                  |
| LSWOLD/12,21.2,20           | 703         | 4.3         | 9.48  | 7.21           | S.r.              |         |           |             |              |                  |                    |         |         |           |           |      |           |        |         | -         |          | 1 28                 |
| 15W01022 212.27             | Ser         | 40          | 10.00 |                | Jos               |         |           |             |              |                  |                    |         |         |           |           |      |           |        |         | N         | X        | M 27                 |
| LSWOLCELA 22-2-23           | 7.04        | 4.01        | 10.01 | 7.19           | 7.04              |         |           |             | G            | 130              | S                  | 1. Chel | 7 h Pa  | · 102     | 1.4       | h Pa | C         | 3      | 27      |           |          | MSM                  |
| LSWOLUTY 22.2.22            | 7.03        | 4.3         | 10.02 |                | 2.2               |         |           | HAN1        |              | 12910            |                    | A       | 2.0     | 102       |           |      |           |        |         |           |          |                      |
| LSWOLD660 23-2-23           | 2.05        | 4.02        | 0.02  | 7.21           | 7.06              | ÷       |           |             | O,           | 1302.            | w 100              | 022.71  | nP~     | ORO       | C         | 1020 | 4         | 23     | 1       |           | T        | C 21-3               |
| LSWOLGIY 23.2.2.5 (         | 6.96        | 4.02        | 10:05 |                | 7.03              |         |           | 1400        |              | 0000             |                    |         | 5       | ion       |           |      |           |        |         |           | *        | son                  |
| LSWOLD20 23-2.7.2           | 7.06        | 4-04        | 10.04 |                | Job               |         |           |             |              |                  |                    |         |         |           |           | _    |           |        |         |           |          | Rin                  |
| LSWOLOGG 24.2.23            | 7.04        | 4.02        | 0.04  | 7.21           | 1.06              |         |           |             |              |                  |                    |         |         |           |           |      |           |        |         |           | 7        | 15 22-2              |
| LSWOLDA LADID               | 7.06        | 4.04        | 5.0   |                | 7.00              |         |           |             |              |                  |                    |         |         |           |           |      |           |        |         |           | R        | 201 20               |
| LSWOLD C 24 2 2             | 7.00        | 4.00        | 0.01  | 7.20           | 5                 |         |           |             |              |                  |                    |         |         |           |           |      |           |        |         |           |          | m                    |
| LSWOID/41 77 - 2-23         | 7.01        | 10.4        | 50.02 | 1.18           | 50.1              |         |           |             |              |                  |                    |         |         |           |           |      |           |        |         |           |          | MS 23.5              |
| LSWOLD 20 17. 2.27          | 7.01        | 4.3         | 0.0   | 7.16           | 1.0.              | 1       |           |             |              |                  |                    |         |         |           |           |      |           |        |         |           | ~ 0      | Arr                  |
| LSWOLDGUL 78-2-27           | 102         | 4.04        | 10.05 |                | JC.C              |         |           |             |              |                  |                    | 0790    | 2000    | 1010      | .650      | 0    | 30 (      |        |         | L P       | 2        | 1 1 21               |
| LSWOL ()) 28.1.1)           | 101         | 4.04        | 80.0  | 7.16           | 6.99              |         |           | 403         | 12           | Sol              | Ĩ4                 | 01      | ř       | 0         | 020       |      |           |        |         | TA IN     | 8        | 201                  |
| LSWOL DU 1. 3 - 23 -        | 7.04        | 4.04        | 0.03  | 7.21           | 7.04              |         |           |             |              |                  |                    | _       |         |           |           |      |           |        |         |           |          | MR 25                |
| LSWOL 673 2-1-3,23          | 6.96        | 84.6        | 0.03  |                | 6.95              |         |           |             |              |                  |                    |         |         |           |           |      |           |        |         | _         | Ø        | DL                   |
| LSWOL DUR 1.3.2) (          | 6.4         | 4.8         | 6.9   |                | 6.94              |         |           |             |              |                  |                    |         |         |           |           |      |           |        |         |           | 2        | DL 1                 |
| LSWOLD LAN 2.3.1.7          | 1.02        | 4.03        | 10.02 |                | t <sup>a</sup> .C |         |           |             |              |                  |                    | **      |         |           |           |      |           |        |         | -         |          | 16-27.0              |

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| Standad or Belch         Contineer         Standad or Belch   |                                     |       | 1 100   | and a  | -              |          |         |           |             |              |                  |                    |         |         |           |             |        |          |       |           |                  |          |                      |
|--|-------------------------------------|-------|---------|--------|----------------|----------|---------|-----------|-------------|--------------|------------------|--------------------|---------|---------|-----------|-------------|--------|----------|-------|-----------|------------------|----------|----------------------|
| Operational Limits         Continue         Value         7.00         ± 0.1           serve_GV2         3/3/2         7.4         - <t< th=""><th>Standard or Batch<br/>number<br/>23WO</th><th>000</th><th>0003</th><th>0004</th><th>1000 (</th><th>230</th><th>22WO</th><th></th><th>22WO</th><th></th><th>2WO</th><th>692</th><th>1010</th><th>_</th><th>521</th><th>22</th><th>22</th><th>22</th><th>21/00</th><th>21/00</th><th>21/00</th><th></th><th></th></t<>  | Standard or Batch<br>number<br>23WO | 000   | 0003    | 0004   | 1000 (         | 230      | 22WO    |           | 22WO        |              | 2WO              | 692                | 1010    | _       | 521       | 22          | 22     | 22       | 21/00 | 21/00     | 21/00            |          |                      |
| $ \begin{array}{ c c c c c c c c c c c c c c c c c c c$  | Operational Limits                  | ± 0.1 | ± 0.1   | ± 0.1  | 7.15-7.25      | td / CRM | 79 - 88 | 142 - 151 | 1369 - 1454 | 9700 - 10300 | 12493 -<br>13266 | 108446 -<br>115154 | d / CRM | <0.2    | 95 - 105% | 217 - 240 ( | S      | s        | s     | ± 0.09 1  | ± 0.10 1         | ± 0.14 1 |                      |
| Meter ID         D Page         pH         EC ( $\mu$ S(m))         DO<br>( $\mu$ or mgL)         OR<br>( $\mu$ or mgL)         Turbidity (NTU)           swore $\alpha_{0,0}$ 2, $\mu$ or   | Certified Value                     | 7.00  | 4.00    | 10.00  | pH<br>Junction | Chk S    | 84      | 146.9     | 1412        | 10000        | 12880            | 111800             | Chk St  | ).0mg/L | 100%      | 229         | NTU    | NTU      | NTU   | 0.24      | 0.95             | 1.63     | Analyst/<br>comments |
| smouthand       The Heat       <   | Meter ID 22 1/2/2                   |       |         | PH     |                |          |         |           | E           | (µS/cm)      |                  |                    |         | C DO    |           | ORP         | Turbid | ty (NTU) | -     | Chlorin   | e (mg/L)         |          |                      |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$   | LSWOLIDER 2417E 7.                  | 00 4  | 102 0   | 24.42  |                | 7.06     |         |           | 1438        |              | 2990             |                    | ~       | 2.0     | 00        |             | _      | -        | -     | -         | _                |          | RMC                  |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$   | LSWOL UNDE 2 1472                   | -     |         |        |                |          |         |           |             |              |                  |                    | _       |         | 2         | 8           | +      | _        | +     | +         | -                |          | 2 2                  |
| $ \begin{array}{c c c c c c c c c c c c c c c c c c c $  | LSWOL6662313123 7.0                 | 24    | 10      | 0.00   | 3.20           | 1:05     |         |           |             |              |                  |                    | _       |         | 2         | -           | +      | +        | +     | +         |                  |          | 120 2                |
| $ \begin{array}{c c c c c c c c c c c c c c c c c c c $  | LSWOLODUL 3/3/22 7.                 | 24    | 1 10.   | 0.0    | 1.17           | 201      |         |           |             |              | _                | _                  | _       | -       | _         | +           | -      | -        | -     | -         |                  |          | 242                  |
|  | LSW010668613123 7.5                 | 3 4   | 03 10   | - 10.0 | 7-19           | 7.04     |         |           |             |              |                  |                    | 4       | _       | +         | +           | -      | +        | -     | -         | +                | +        | RVU                  |
| $ \begin{array}{c c c c c c c c c c c c c c c c c c c $  | LSWOLD 13/13 7:0                    | 224   | 02 10   | 60.1   |                | 1.04     |         |           |             |              | _                |                    | +       | -       | +         | -           | +      | +        | +     | -         | +                | +        | Nº. 2                |
|  | LSWOLCHR 7/5/23 AC                  | 84    | 100 9   | i'ra   |                | 7.65     |         |           | 1412        |              | 400 A            | ホー                 | t       | -       | _         | -           | -      |          | +     | +         | -                | 2        | N NO                 |
| smoling       given rate   | 12MOLUNG 212/25 1-0                 | 22 4  | 1) 0    | 10.0   |                | 701      |         |           |             |              |                  |                    | _       |         | _         | -           | +      | -        |       | +         | -                | 5        | 10                   |
| $ \frac{8W0LQ32}{8W0LQ32} \frac{(1)}{(1)} \frac{13}{123} \frac{1.01}{10} \frac{1.02}{10.04} \frac{1.004}{10.04} \frac{1.007}{10} \frac{1.007}{10} \frac{1.071}{10} \frac{(0.04)}{10} \frac{1.007}{10} 1.00$   | LSWOLD260 8/3/23 7.0                | 1 00  | 01 0    | 38     | 1              | 7.03     |         |           | 46          | 12           | 0180             | iL                 | 20      |         | -         | -           | -      | +        | +     | +         | +                | 2        | Prin a               |
| $\frac{1}{12} \frac{1}{12} \frac$ | LSWOLDON TIS 12 1/1                 | 10    | 1 70.   | .94    |                | 20.1     |         |           |             |              |                  |                    |         |         |           |             |        |          | -     | -         | _                | 2        | 15 28.0              |
| $ \frac{1}{28001000} \frac{1}{13} \frac{1}{23} \frac{1}{23} \frac{1}{23} \frac{1}{100} \frac{1}{1000} $   |                                     | V     | 2       | x c    | 4              | 2        |         |           | }           |              | ,                |                    | 2       | -       | -         |             | -      | -        |       |           |                  | de       | 26.2                 |
| $ \frac{\text{swol} 224}{\text{swol} 4.3,23} = 1 + 0210.60 + 24 + 1417 + 12840 + 1424 + 1423 + 12840 + 1424 + 1433 + 12840 + 1424 + 1437 + 12840 + 1424 + 1437 + 12840 + 1424 + 1437 + 12840 + 1424 + 1437 + 12840 + 1424 + 1437 + 12840 + 1424 + 1437 + 14$   | LSWOLDY CITY TI                     | 54    | · · · · | 0.04   | ñ              | 10.01    |         |           | An          | 6969         | 50               | 0                  | C       | s<br>j  | 1008.     | 8620        | 2 60-  | 13000    | C C   | $\square$ | $\left  \right $ | 24       | Ly Celes             |
| $ \frac{smol 044}{10} \frac{10}{9} \cdot 3.13}{7 \cdot 1} \frac{1}{9} \cdot 02 \frac{10}{10} \frac{10}{10} \frac{1}{10}      | LSWOP262 9.3.23                     |       |         |        |                |          | 64      |           | イ (ナ)       |              | 1540             | 1                  | 04      | 1       | 0         | +           | +      | +        | +     | +         | +                |          | Kny                  |
| $ \frac{133.23}{1000} \frac{133.23}{100} \frac{133.23}{1000}  \frac{133.23}{10000} \frac{133.23}{10000} \frac{133.23}{100000} \frac{133.23}{100000} \frac{133.23}{1000000} \frac{133.23}{100000000} \frac{133.23}{1000000000} \frac{133.23}{10000000000} \frac{133.23}{10000000000000} \frac{133.23}{1000000000000000000000000000000000000$  | LSWOL 0400 8-3.23 7.0               | 24    | 0210    | 8      |                | ion      | NOW     | hecic     | Std.        | 200-         | the of           | 2                  | 2110    | 50      | - 1       | 3           | +      | -        | +     | +         | +                | R        | 5 245                |
| $\frac{14}{12} = 12323 = $   | LSWOLCGO 3.3.23 7 3                 | 4     | .SZ 10  | és     | ,              |          |         |           |             | 1            | 101              | 4                  |         | 0011    | -         |             |        |          | +     |           | +                | 12       | Nr. ZH C             |
| $ \frac{1}{100} \frac{1}{202} \frac{1}{10} \frac{1}{3} \frac{1}{10}$     | LSWOLG7 Q 13.3.23                   | _     |         |        |                |          |         | -         | Ast         | 100          | 5                | -                  |         | _       | +         | +           |        |          | -     |           |                  | R        | SUL                  |
| MOLGING     H. 5.13     7.02     H. 01     1.02       MOLGING     H. 5.13     7.02     H. 01     10.01     1.03       MOLGING     14.3.23     7.04     4.03     10.04     7.14     7.05       MOLGING     14.3.23     7.04     4.03     10.04     7.14     7.05     1438     12800       MOLGING     14.3.23     10.94     4.01     10.04     7.14     7.05     1438     12800       MOLGING     14.3.23     10.04     10.05     1.438     12810     1412  | LSWOLDD 17.3.17 7.5                 | A     | CX XC   | j.     | 5              | 2        |         |           | e           | 1            | NOD              | Ŧ                  | 0       |         | -         | +           |        |          |       | -         |                  | 6        | 1-1                  |
| MOLDER 14.3.23 7.04 4.03 10.04 7.14 7.05 1428 2603 1408 12.803 1408 14.3.23 6.99 4.01 10.04 6.77 855 1428 12810 1412 1408  | SWOLD & H. S. 13 7.0                | 5     | 0 10    | 0      | N              | 1.03     |         | _         |             | -            | +                | -                  | -       | -       | -         | +           |        | +        | +     |           | -                | R        | in                   |
| MOLOGG 14-3.23 6.99 4.01 10.04 6.77 85 1418 120 1412 1412  | SWOLDER 14.3.13 7.0                 | A A   | 3       | 0      | C 19-0         | is s     |         |           | 478         | 1            | 1                | Ā                  | X       | +       | -         | +           |        | +        | -     |           |                  | MS       | 22.20                |
| WOLA66 15 5:28 70 2 4 01 10.03 7 16 7.02   | SWOLD662 14-3.23 6.9                | 4 4   | 01 10   | 49.    | 6              | 26.97    | 65      |           | 418         | 110          | 5 (              | 1                  | 5 6     | -       | +         | +           |        | +        | +     | +         | +                | Nel      | 23.3                 |
|  | SWOL 046 15 .5.25 70                | 5 4   | 01 10   | 5.7    | . 16 >         | 102      |         |           | -           |              |                  | 1                  |         | +       | +         |             | +      | +        | 1     | t         | +                | N        | Wers                 |

Data Annual . Ar incinen

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**Field Calibration Form** 

|                 |                    | i -           |             | j         |            | _          | ļ          |            | 6         |             | _         |          |            |          | _          |          |            |          | _          |           |           | _          |             |           | _        |
|-----------------|--------------------|---------------|-------------|-----------|------------|------------|------------|------------|-----------|-------------|-----------|----------|------------|----------|------------|----------|------------|----------|------------|-----------|-----------|------------|-------------|-----------|----------|
|                 |                    | Comments      |             | RAL /163  | Ful        | Pul        | Rin        | M5 / 12.79 | Rul 15.   | MS 16.20    | MS/16. PC | MS/15.89 | -          | Par /    | Port       | RNN      | RN         | Rnc      | RUL        | SW        | SW        | 5W         | MS          | ROL       | MG       |
| ۱<br>۲۱/۵۵      | 41.0±              | £9.1          | (T)         |           |            |            |            |            |           |             |           |          |            |          | . )        | 3        |            |          |            |           |           |            |             |           |          |
| ۱<br>221/00     | 01.0±.             | 96.0          | rine (mg    |           |            |            |            |            |           |             |           |          |            |          | 24         | 015      |            |          |            |           |           |            |             |           |          |
| ۱<br>251/00     | 60.0 <del>±</del>  | 0.24          | Chlo        |           |            |            |            |            |           |             |           |          |            |          |            | 3        |            |          |            |           |           |            |             |           |          |
|                 |                    | υти           | n)          |           |            |            | a.         |            | Ģ.        |             |           |          |            |          | 5          | mber     |            |          |            |           |           |            |             |           |          |
|                 |                    | ОТИ,          | idity (NT   |           |            |            |            |            |           |             |           | (        | ( )        |          | VC         | 9450     |            |          |            |           |           | -          |             |           |          |
|                 |                    | υти           | Turb        |           |            |            |            |            |           |             |           |          | IN.I       |          |            | 6        | 9          |          |            |           |           |            |             |           |          |
|                 | 212 - 240          | 529           | ORP<br>(mV) |           |            |            |            |            |           |             |           |          | 101        |          |            | 2        |            |          |            |           |           |            |             | 1         |          |
|                 | %90L - 96          | %00L          | (T/bu       |           |            |            | 102.6      |            |           |             |           |          | 3)2.       | 105      | 101        | 105      |            |          |            |           |           |            |             |           |          |
|                 | 2.0>               | J\gm0.0       | D(% or I    |           |            |            | 2.05       |            | 14        |             |           |          | 104        | 7.0%     | 202        | 2.07     |            |          |            |           |           | +          |             |           |          |
| 2100            | NA) / DRM          | S AND         |             |           | 1446       | 145        | 450        |            |           |             |           |          |            | 45       | 435        | c5+1     | 1432       | 1431     |            |           |           |            | 1440        |           |          |
|                 | - 944801<br>115154 | 008111        |             |           |            |            | -          |            |           |             |           |          |            |          |            |          |            |          |            |           |           |            |             |           |          |
| BOC             | 13266<br>12493 -   | 12880         | (           |           | Ostel      | 13280      | (132(1))   |            |           |             |           |          |            | 0900     | 0550       | 120180   | 3210       | 13400    |            |           |           |            | 12880       |           |          |
|                 | 00601 - 0076       | 00001         | C (µS/cn    |           | -          |            |            |            |           |             |           |          |            |          |            |          |            |          |            |           |           |            |             |           |          |
| 2200            | 1369 - 1454        | 2141          | Ш           |           | 144        | 1415       | 1412       |            |           |             |           |          |            | M17      | 44         | 1418     | 14500      | 1418     |            |           |           |            | 1410        |           |          |
|                 | 142 - 151          | 6.941         |             |           | 6          |            |            |            |           |             |           |          |            |          |            |          |            |          |            |           |           |            |             |           |          |
| S3WO            | 88 - 62            | 84            |             |           |            |            |            |            |           |             |           |          |            |          |            |          |            |          |            |           |           |            |             |           |          |
| 001             | td / CRM           | S XYO         |             | 7.04      |            | 7.55       | 7.05       | 7.05       | 7:07      | 3.05        | 7.06      | T.O.T    | 6.97       | 702      | 7.08.      | 40.6     | 7.02       | 1.05     | 7.05       | 7.02      | 7.05      | 7.06       | 7.03        | 20.0      | 30.E     |
| 290             | 32.7-31.7          | Hq<br>noitonu |             | 07.6      |            | 1.2        |            |            |           |             |           |          |            | 7.13     | 97.6       | 1.22     |            | 1.2      | ter        | 7.18      |           |            |             |           | 7.24     |
| 004             | r.0±               | 00.01         | 펍           | 0.01      |            | 01.01      | 10.01      | 80.0       | 10.04     | io.io       | 0.04      | 80.01    | 10.01      | 10.01    | 0.01       | Cc-01    | 60.01      | 10.01    | 90.00      | 10.06     | 10.06     | 10-08      | 10.07       | 90.01     | 10.07    |
| 000             | r.0±               | 4.00          |             | 10.4      |            | 4.00       | 65.5       | 10.4       | 1.2%      | 1.00        | 1.02      | 10.4     | 10.4       | F-04     | 4.04       | 4.4      | 165        | 4.02     | dit.       | 4.00      | 4.00      | 4.92       | 4.00        | 10.4      | ho.t     |
| 00              | ŀ.0± .             | 00.7          | 1.0.1       | tot       |            | tor        | 7.55       | 7.06       | Ce C      | 7.06        | 7.05      | 7.06     | 0-96       | tor      | 7 08       | 2.4      | 10.t       | 20.L     | 2000       | 7.03      | 7.06      | 7.05       | 7.03        | 90.6      | 2.05     |
| or Batch<br>ber | al Limits          | I Value       | Date        | 19-5.23   | 19-5.23    | CT:5-51    | 22.5.2     | 23-523     | 23.5.23   | 23-5-23     | 24.6-23   | 62-9-97  | 27.6-23    | 313.2    | 0.5.10     | 57.9.1   | 5.6.23     | 5.6.23   | 5 6.23     | 6-6-23    | 7.6.23    | 8,6-23     | B. 6 . 23   | 51.9.41   | 62.0.23  |
| Standard<br>num | Operation          | Certified     | Meter ID    | ALSWOLOGO | ALSWOLD AN | ALSWOLOTZU | ALSWOLJOOL | ALSWOLD666 | ALSWOLO22 | ALSWOLD2% G | ALSWOL    | ALSWOLOG | ALSWOLODEC | ALSWOLOT | ALSWOLJOUL | ALSWOLO7 | ALSWOLDZEG | ALSWOLON | ALSWOLOV() | ALSWOLP26 | ALSWOLD26 | ALSWOLD 66 | ALSWOLD 2 6 | ALSWOLD?6 | ALSWOLDL |

Page 1 of 1

Date Approved : 15/06/2020

ENFM (56/4)

#### **Gas Verification Certificate**

| Instrument | Huber Laser |
|------------|-------------|
| Serial No. | 19255.18    |
| Sensors    | Laser       |



Air-Met Scientific Pty Ltd 1300 137 067

| Item          | Test                 | Pass |     | Co   | mments |      |
|---------------|----------------------|------|-----|------|--------|------|
| Battery       | Charge Condition     | 1    |     |      |        |      |
|               | Fuses                | 1    |     |      |        |      |
|               | Capacity             | 1    |     |      |        |      |
|               | Recharge OK?         | 1    |     |      |        |      |
| Switch/keypad | Operation            | 1    |     |      |        |      |
| Display       | Intensity            | 1    |     |      |        |      |
|               | Operation (segments) | 1    |     |      |        |      |
| Grill Filter  | Condition            | 1    |     |      |        |      |
|               | Seal                 | 1    |     |      |        |      |
| Pump          | Operation            |      |     |      |        |      |
| 1000          | Filter               |      |     |      |        |      |
|               | Flow                 |      |     |      |        |      |
|               | Valves, Diaphragm    |      |     |      |        |      |
| PCB           | Condition            | 1    |     |      |        |      |
| Connectors    | Condition            | 1    |     |      |        |      |
|               |                      |      | Low | High | TWA    | STEL |
| Sensor        | Laser                | 1    |     |      |        |      |
|               |                      | 1    |     |      |        |      |
|               |                      | 1    |     |      |        |      |
|               |                      | 1    |     |      |        |      |
|               |                      |      |     | -    |        |      |
|               |                      |      |     |      |        |      |
| Alarms        | Beeper               | 1    |     |      |        |      |
|               | Settings             | 1    |     |      |        |      |
| Software      | Version              |      |     |      |        |      |
| Datalogger    | Operation            |      |     |      |        |      |
| Download      | Operation            |      |     |      |        |      |
| Other tests:  |                      |      |     |      |        |      |

**Bump Test Certification** This is to certify that the above instrument has been calibrated to the following specifications:

| Diffusion mode | Aspirated mode |                                   |           |                  |                    |
|----------------|----------------|-----------------------------------|-----------|------------------|--------------------|
| Sensor         | Serial no      | Calibration gas and concentration | Certified | Gas bottle<br>No | Instrument Reading |
| CH4            |                | 500ppm CH4                        | NIST      | sy460            | 500 ppm CH4        |
| CH4            |                | 2.5 % vol CH4                     | NIST      | BC363930         | 2.5 % vol CH4      |
|                |                |                                   |           |                  | L.                 |
|                |                |                                   |           |                  |                    |
|                |                |                                   |           |                  |                    |

Bump Test by:

Jemma Treseder

Date:

9/8/23

# CERTIFICATION **OF CALIBRATION**



Serial Number



# Issued by: QED Environmental Systems Ltd.

Calibration certificate number

Instrument

Laser One

19255 H-09418

19255

#### Description of the calibration procedure:

The calibration is verified with certified gas bottle. The maximum error of the instrument as specified in the datasheet.

Gas verification from 0-1000ppm CH4

| Full scale<br>(ppm) | Gas concentration<br>(ppm) | Response 1<br>(ppm) | Response 2<br>(ppm) | Response 3<br>(ppm) | Average<br>response<br>(ppm) | Maximum<br>error (ppm) | Maximum<br>error<br>(% F.s.) | Maximum error<br>% |
|---------------------|----------------------------|---------------------|---------------------|---------------------|------------------------------|------------------------|------------------------------|--------------------|
| 1000                | 0.0                        | 0                   | 0                   | 0                   | 0.00                         | 0.00                   | 0.00                         | 0.00               |
| 1000                | 2.91                       | 3                   | 3                   | 3                   | 3.00                         | 0.09                   | 0.01                         | 0.01               |
| 1000                | 10.3                       | 10.3                | 10.3                | 10.3                | 10.30                        | 0.00                   | 0.00                         | 0.00               |
| 1000                | 101.0                      | 101                 | 101                 | 101                 | 101.00                       | 0.00                   | 0.00                         | 0.00               |
| 1000                | 1004                       | 1000                | 1000                | 1000                | 1000.00                      | 4.00                   | 0.40                         | 0.40               |
|                     |                            |                     |                     |                     |                              | Uncertainty            | 0.40                         | %                  |
|                     |                            |                     |                     |                     |                              | Max % error            | 0.40                         | % FS               |

| Gas verificatio | n from     | 0-100% vol CH4   |
|-----------------|------------|------------------|
| Gas vermeatio   | ii ii oiii | 0-100/0 001 0114 |

| Full scale<br>(%vol) | Gas concentration<br>(%vol) | Response 1<br>(%vol) | Response 2<br>(%vol) | Response 3<br>(%vol) | Average<br>response<br>(%vol) | Maximum<br>error<br>(%vol) | Maximum<br>error<br>(% F.s.) | Maximum error<br>% |
|----------------------|-----------------------------|----------------------|----------------------|----------------------|-------------------------------|----------------------------|------------------------------|--------------------|
| 100.00               | 0.00                        | 0.00                 | 0.00                 | 0.00                 | 0.00                          | 0.00                       | 0.00                         | 0.00               |
| 100.00               | 2.20                        | 2.20                 | 2.20                 | 2.20                 | 2.20                          | 0.00                       | 0.00                         | 0.00               |
| 100.00               | 5.00                        | 5.00                 | 5.00                 | 5.00                 | 5.00                          | 0.00                       | 0.00                         | 0.00               |
| 100.00               | 15.00                       | 15.00                | 15.00                | 15.00                | 15.00                         | 0.00                       | 0.00                         | 0.00               |
| 100.00               | 50.00                       | 49.90                | 49.90                | 49.90                | 49.90                         | 0.10                       | 0.10                         | 0.10               |
| 100.00               | 100.00                      | 100.00               | 100.00               | 100.00               | 100.00                        | 0.00                       | 0.00                         | 0.00               |
|                      |                             |                      |                      |                      |                               | Uncertainty                | 0.10                         | %                  |

Uncertainty Max % error 0.10

Gas verification from

0-100% CH4 LEL (0-4.4% VOL)

| Full scale<br>(%vol) | Gas concentration<br>(LEL%) | Response 1<br>(LEL%) | Response 2<br>(LEL%) | Response 3<br>(LEL%) | Average<br>response<br>(%vol) | Maximum<br>error<br>(LEL%) | Maximum<br>error<br>(% F.s.) | Maximum error<br>% |
|----------------------|-----------------------------|----------------------|----------------------|----------------------|-------------------------------|----------------------------|------------------------------|--------------------|
| 100.00               | 0.00                        | 0.00                 | 0.00                 | 0.00                 | 0.00                          | 0.00                       | 0.00                         | 0.00               |
| 100.00               | 2.00                        | 2.00                 | 2.00                 | 2.00                 | 2.00                          | 0.00                       | 0.00                         | 0.00               |
| 100.00               | 50.00                       | 50.00                | 50.00                | 50.00                | 50.00                         | 0.00                       | 0.00                         | 0.00               |

| Uncertainty | 0.00 | %    |
|-------------|------|------|
| Max % error | 0.00 | % FS |

% FS

www.qedenv.com +44 (0) 333 800 0088 sales@qedenv.co.uk

QED Environmental Systems Ltd. Cyan Park - Unit 3, Jimmy Hill Way, Coventry, CV2 4QP, UNITED KINGDOM Page 1 of 2

# CERTIFICATION **OF CALIBRATION**





# Issued by: QED Environmental Systems Ltd.

Environmental conditions during calibration

| Temp.    | 18.5 | С    |  |
|----------|------|------|--|
| Pressure | 977  | mBar |  |

#### Gas bottles used for calibration

| Gas      | Cylinder number       | Expiry date | Gas |  |
|----------|-----------------------|-------------|-----|--|
| N2       | S1261680T             | 16/05/2024  | N2  |  |
| 3 ppm    | pm 292675 17/08/20    |             | CH4 |  |
| 10 ppm   | 119779SG              | 11/04/2024  | CH4 |  |
| 100 ppm  | S1729157              | 08/03/2028  | CH4 |  |
| 1000 ppm | S1147710R             | 03/01/2028  | CH4 |  |
| 1.0% Vol | 1.0% Vol \$11984155   |             | CH4 |  |
| 2.2% vol | 1713254               | 13/12/2027  | CH4 |  |
| 5.0% vol | 217147                | 03/12/2024  | CH4 |  |
| 15% vol  | vol 269223 07/11/2023 |             | CH4 |  |
| 50% vol  | 189051SG 23/02/2024   |             | CH4 |  |
| 100% vol | S1182097S             | 15/11/2025  | CH4 |  |

Calibration results: Pass

Next scheduled calibration: 03/04/2024

Calibration date: 03/04/2023

Issued by: Keeley Knight

www.qedenv.com +44 (0) 333 800 0088 sales@qedenv.co.uk

QED Environmental Systems Ltd. Cyan Park - Unit 3, Jimmy Hill Way, Coventry, CV2 4QP, UNITED KINGDOM Page 2 of 2 Registered in England and Wales 1898734



Appendix J: Gas Flare Reports



# **PEOPLE ENGINEERING** A ZERO CARBON, CLEAN ENERGY FUTURE.

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# **PROJECT PROFILE: DUNMORE, NSW**

We expedite the transition to renewables with clean energy and carbon abatement solutions. Carbon credits enable a commercially viable project to create additional abatement. **Results Achieved since the Project Commenced\*** 



**BIOGAS CAPTURED** 

23.4 million m3



**CARBON ABATEMENT** 

222 thousand tonnes (t CO2e - environmental benefit)



**ACCUs CREATED** 

92 thousand Australian Carbon Credit Units



SEEDLINGS PLANTED CARS OFF THE ROAD

3.7 million seedlings planted for 10 years (t CO2e)



6.093 for the last 12 months of carbon abatement (t CO2e)

#### **BIOGAS CAPTURE AND CARBON ABATEMENT FROM LANDFILL**

- Long-term contract with Shellharbour City Council to recover and beneficially use biogas and abate carbon from this regional landfill in Dunmore. This improves air quality, reduces greenhouse gas emissions and contributes to the local economy.
- No regulatory requirement to capture biogas, however ACCUs enable additional carbon abatement (above its 30% baseline) • from a commercially viable flaring project under the Emissions Reduction Fund (ERF).
- Since 2013, LGI installed a bespoke biogas management system with an LGI 1000 ERF compliant biogas flare. Council • benefits from this bespoke system at minimal cost.
- LGI collaborates closely with the Council regarding the design, installation, operations and maintenance of the biogas • management system, including the monitoring and reporting services provided.

P: +61 7 3711 2225 E: enquiries@lgi.com.au in: linkedin.com/company/lgi-ltd 57 Harvey Street N, Eagle Farm QLD 4009

Saving the planet one landfill, one megawatt, one solar panel, one battery at a time



| Site:         | Dunmore                   | Report issue date: | 14/11/2022    |
|---------------|---------------------------|--------------------|---------------|
| Report month: | October 2022              | Prepared by:       | Grace Tap     |
| Prepared for: | Shellharbour City Council | Checked by:        | Jessica North |

| Comments on         | January 2016 - LGI disconnected the 4 lateral wells and 8 vertical wells.                        |  |  |  |  |  |
|---------------------|--|--|--|--|--|--|
| changes to existing | • April 2016 - LGI reconnected 8 vertical wells in the SE corner and 4 lateral wells.            |  |  |  |  |  |
| system:             | • June 2016 - LGI disconnected the extended gas capture system to assist council.                |  |  |  |  |  |
|                     | • September 2016 - LGI disconnected the extended gas capture system to assist council.           |  |  |  |  |  |
|                     | <ul> <li>November 2016 - LGI commissioned the connection to leachate sump 6 as of</li> </ul>     |  |  |  |  |  |
|                     | 23-11-2016.  |  |  |  |  |  |
|                     | • May 2017 - LGI installed an additional 10 vertical wells to the existing LFG system            |  |  |  |  |  |
|                     | • November 2019 - LGI on site to move mainline up batter, and reconnected infrastructure         |  |  |  |  |  |
|                     | that had been previously disconnected, including 4 wells on the dimple and a 160mm               |  |  |  |  |  |
|                     | leachate riser.  |  |  |  |  |  |
|                     | <ul> <li>April 2020 - LGI installed a flowline to sump 6 after earlier disconnection.</li> </ul> |  |  |  |  |  |
|                     | <ul> <li>February 2021 - LGI installed 13 new vertical wells, including a new submain</li> </ul> |  |  |  |  |  |
|                     | • March 2022 - LGI replaced the flare gas analyser panel with a Draeger model analyser           |  |  |  |  |  |
|                     | for greater accuracy and reliability   |  |  |  |  |  |
|                     | August 2022 - LGI repaired the 225mm mainline and adjacent submain to allow for                  |  |  |  |  |  |
|                     | intermediate capping to continue across the top of cell 3  |  |  |  |  |  |
| Comments on         | Availability - 99.38%  |  |  |  |  |  |
| operation /         | Down Time: 4.58hrs   |  |  |  |  |  |
| maintenance:        |  |  |  |  |  |  |
|                     |  |  |  |  |  |  |
|                     | Field Tuned:   |  |  |  |  |  |
|                     | - 31/10/2022   |  |  |  |  |  |
| Recommendations:    | After discussion with Council, LGI will re investigate options for leachate pumping out of       |  |  |  |  |  |
|                     | gas extraction wells   |  |  |  |  |  |
|                     |  |  |  |  |  |  |

# Flare Operational Data:

| Date       | CH4 % | CO2 % | O2 % | FLOW m3/h | STACK TEMP C | CUMULATIVE FLOW m3 |
|------------|-------|-------|------|-----------|--------------|--------------------|
| 10/10/2022 | 37.1  | 27.2  | 0.3  | 320       | 769          | 23,176,716         |
| 18/10/2022 | 36    | -     | 1    | 357       | 614          | 23,243,922         |
| 26/10/2022 | 41.1  | 29.7  | 0.1  | 327       | 662          | 23,311,015         |
| 31/10/2022 | 39.2  | 26.4  | 0.1  | 392       | 767          | 23,355,257         |
| Average    | 38.35 | 27.77 | 0.37 | 349       | 703          | -                  |





## Dunmore- Methane, Carbon Dioxide & Oxygen





Date

#### **BIOGAS MONTHLY REPORT - DUNMORE**



#### Dunmore - Cumulative Flow



- 23,360,830 of combusted landfill gas up to 1 November 2022, which represents;

- 221,872 tonnes of CO2 equivalent (total methane abated by gas capture system to date).
- 3,697,864 seedlings planted for 10 years
- 6,093 (cars off the road for the last 12 months)
- 92,714 Australian Carbon Credit Units
- Biogas captured is the cumulative flow reading at the last day of the month.

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#### Please note:

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This report is for the exclusive use of the client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from LGI. LGI disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.

Where LGI has been accorded gas rights under the terms and conditions of the agreement with the client, the data contained in this report represents confidential commercial information and should not be copied or disseminated in any form to a third party without prior consent from LGI.



# **PEOPLE ENGINEERING** A ZERO CARBON, CLEAN ENERGY FUTURE.

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# **PROJECT PROFILE: DUNMORE, NSW**

We expedite the transition to renewables with clean energy and carbon abatement solutions. Carbon credits enable a commercially viable project to create additional abatement. **Results Achieved since the Project Commenced\*** 



**BIOGAS CAPTURED** 

23.6 million m3



**CARBON ABATEMENT** 

224 thousand tonnes (t CO2e - environmental benefit)



**ACCUs CREATED** 

92 thousand Australian Carbon Credit Units



SEEDLINGS PLANTED CARS OFF THE ROAD

3.7 million seedlings planted for 10 years (t CO2e)



6.091 for the last 12 months of carbon abatement (t CO2e)

#### **BIOGAS CAPTURE AND CARBON ABATEMENT FROM LANDFILL**

- Long-term contract with Shellharbour City Council to recover and beneficially use biogas and abate carbon from this regional landfill in Dunmore. This improves air quality, reduces greenhouse gas emissions and contributes to the local economy.
- No regulatory requirement to capture biogas, however ACCUs enable additional carbon abatement (above its 30% baseline) • from a commercially viable flaring project under the Emissions Reduction Fund (ERF).
- Since 2013, LGI installed a bespoke biogas management system with an LGI 1000 ERF compliant biogas flare. Council • benefits from this bespoke system at minimal cost.
- LGI collaborates closely with the Council regarding the design, installation, operations and maintenance of the biogas • management system, including the monitoring and reporting services provided.

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Saving the planet one landfill, one megawatt, one solar panel, one battery at a time



| Site:         | Dunmore                   | Report issue date: | 16/12/2022     |
|---------------|---------------------------|--------------------|----------------|
| Report month: | November 2022             | Prepared by:       | Grace Tap      |
| Prepared for: | Shellharbour City Council | Checked by:        | Thomas Schnatz |

| • January 2016 - LGI disconnected the 4 lateral wells and 8 vertical wells.                      |  |  |  |  |  |
|--|--|--|--|--|--|
| • April 2016 - LGI reconnected 8 vertical wells in the SE corner and 4 lateral wells.            |  |  |  |  |  |
| : • June 2016 - LGI disconnected the extended gas capture system to assist council.              |  |  |  |  |  |
| • September 2016 - LGI disconnected the extended gas capture system to assist cou                |  |  |  |  |  |
| • November 2016 - LGI commissioned the connection to leachate sump 6 as of                       |  |  |  |  |  |
| 23-11-2016.  |  |  |  |  |  |
| • May 2017 - LGI installed an additional 10 vertical wells to the existing LFG system            |  |  |  |  |  |
| • November 2019 - LGI on site to move mainline up batter, and reconnected infrastructure         |  |  |  |  |  |
| that had been previously disconnected, including 4 wells on the dimple and a 160mm               |  |  |  |  |  |
| leachate riser.  |  |  |  |  |  |
| <ul> <li>April 2020 - LGI installed a flowline to sump 6 after earlier disconnection.</li> </ul> |  |  |  |  |  |
| • February 2021 - LGI installed 13 new vertical wells, including a new submain                   |  |  |  |  |  |
| • March 2022 - LGI replaced the flare gas analyser panel with a Draeger model analyser           |  |  |  |  |  |
| for greater accuracy and reliability   |  |  |  |  |  |
| August 2022 - LGI repaired the 225mm mainline and and adjacent sub main to allow for             |  |  |  |  |  |
| intermediate capping to continue across the top of cell 3  |  |  |  |  |  |
| Availability - 100.00%   |  |  |  |  |  |
| Down Time: 0.00hrs   |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Field Tuned:   |  |  |  |  |  |
| - 30/11/2022   |  |  |  |  |  |
| After discussion with Council, LGI will re investigate options for leachate pumping out of       |  |  |  |  |  |
| gas extraction wells   |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

# Flare Operational Data:

| Date       | CH4 %  | CO2 % | O2 %  | FLOW m3/h | STACK TEMP C | CUMULATIVE FLOW m3 |
|------------|--------|-------|-------|-----------|--------------|--------------------|
| 07/11/2022 | 35.5   | 25.7  | 0.1   | 380       | 697          | 23,419,647         |
| 16/11/2022 | 35     | -     | 0     | 375       | 667          | 23,501,523         |
| 24/11/2022 | 35.8   | 25    | 0.5   | 370       | 645          | 23,573,405         |
| 30/11/2022 | 36.2   | 25.4  | 0.1   | 364       | 730          | 23,625,627         |
| Average    | 35.625 | 25.37 | 0.175 | 372       | 685          | -                  |





## Dunmore- Methane, Carbon Dioxide & Oxygen





#### **BIOGAS MONTHLY REPORT - DUNMORE**



#### **Dunmore - Cumulative Flow**



- 23,631,365 of combusted landfill gas up to 1 December 2022, which represents;

- 224,441 tonnes of CO2 equivalent (total methane abated by gas capture system to date).
- 3,740,688 seedlings planted for 10 years
- 6,091 (cars off the road for the last 12 months)
- 92,714 Australian Carbon Credit Units
- Biogas captured is the cumulative flow reading at the last day of the month.

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## **PROJECT PROFILE: DUNMORE, NSW**

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**BIOGAS CAPTURED** 

23.9 million m3



**CARBON ABATEMENT** 

227 thousand tonnes (t CO2e - environmental benefit)



**ACCUs CREATED** 

92 thousand Australian Carbon Credit Units



SEEDLINGS PLANTED CARS OFF THE ROAD

3.8 million seedlings planted for 10 years (t CO2e)



6.139 for the last 12 months of carbon abatement (t CO2e)

#### **BIOGAS CAPTURE AND CARBON ABATEMENT FROM LANDFILL**

- Long-term contract with Shellharbour City Council to recover and beneficially use biogas and abate carbon from this regional landfill in Dunmore. This improves air quality, reduces greenhouse gas emissions and contributes to the local economy.
- No regulatory requirement to capture biogas, however ACCUs enable additional carbon abatement (above its 30% baseline) • from a commercially viable flaring project under the Emissions Reduction Fund (ERF).
- Since 2013, LGI installed a bespoke biogas management system with an LGI 1000 ERF compliant biogas flare. Council • benefits from this bespoke system at minimal cost.
- LGI collaborates closely with the Council regarding the design, installation, operations and maintenance of the biogas • management system, including the monitoring and reporting services provided.

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| Site:         | Dunmore                   | Report issue date: | 16/01/2022     |
|---------------|---------------------------|--------------------|----------------|
| Report month: | December 2022             | Prepared by:       | Grace Tap      |
| Prepared for: | Shellharbour City Council | Checked by:        | Thomas Schnatz |

| Comments on         | January 2016 - LGI disconnected the 4 lateral wells and 8 vertical wells.                                |
|---------------------|--|
| changes to existing | <ul> <li>April 2016 - LGI reconnected 8 vertical wells in the SE corner and 4 lateral wells.</li> </ul>  |
| system:             | <ul> <li>June 2016 - LGI disconnected the extended gas capture system to assist council.</li> </ul>      |
|                     | • September 2016 - LGI disconnected the extended gas capture system to assist council.                   |
|                     | <ul> <li>November 2016 - LGI commissioned the connection to leachate sump 6 as of</li> </ul>             |
|                     | 23-11-2016.  |
|                     | <ul> <li>May 2017 - LGI installed an additional 10 vertical wells to the existing LFG system</li> </ul>  |
|                     | • November 2019 - LGI on site to move mainline up batter, and reconnected infrastructure                 |
|                     | that had been previously disconnected, including 4 wells on the dimple and a 160mm                       |
|                     | leachate riser.  |
|                     | <ul> <li>April 2020 - LGI installed a flowline to sump 6 after earlier disconnection.</li> </ul>         |
|                     | <ul> <li>February 2021 - LGI installed 13 new vertical wells, including a new submain</li> </ul>         |
|                     | <ul> <li>March 2022 - LGI replaced the flare gas analyser panel with a Draeger model analyser</li> </ul> |
|                     | for greater accuracy and reliability   |
|                     | August 2022 - LGI repaired the 225mm mainline and and adjacent submain to allow for                      |
|                     | intermediate capping to continue across the top of cell 3  |
|                     | - December 2022 - LGI installed a pneumatic bore pump in a j-trap, allowing for greater                  |
|                     | reliability of condensate management in the main gas line.   |
| Comments on         | Availability - 100.00%   |
| operation /         | Down Time: 0.00hrs   |
| maintenance:        |  |
|                     |  |
|                     | Field Tuned:   |
|                     | - 22/12/2022   |
| Recommendations:    | After discussion with Council, LGI will re investigate options for leachate pumping out of               |
|                     | gas extraction wells   |
|                     |  |
|                     |  |

#### Flare Operational Data:

| Date       | CH4 % | CO2 % | O2 % | FLOW m3/h | STACK TEMP C | CUMULATIVE FLOW m3 |
|------------|-------|-------|------|-----------|--------------|--------------------|
| 08/12/2022 | -     | -     | 1    | 346       | 755          | 23,693,447         |
| 15/12/2022 | -     | -     | 1    | 341       | 755          | 23,752,988         |
| 22/12/2022 | 39.9  | 26.6  | 0.2  | 363       | 771          | 23,811,530         |
| 27/12/2022 | 34    | -     | 1    | 355       | 718          | -                  |
| Average    | 36.95 | 26.6  | 0.8  | 351       | 750          | -                  |





#### Dunmore- Methane, Carbon Dioxide & Oxygen





Date

#### **BIOGAS MONTHLY REPORT - DUNMORE**



# $rac{25,000,00}{20,000,000}$ $rac{15,000,000}{5,000,000}$ $rac{10,000,000}{5,000,000}$ $rac{10,000,000}{2016}$ $rac{10,000,000}{2016}$ $rac{10,000,000}{2016}$ $rac{10,000,000}{2016}$ $rac{10,000,000}{2016}$ $rac{10,000,000}{2016}$

#### **Dunmore - Cumulative Flow**

- 23,893,596 of combusted landfill gas up to 1 January 2023, which represents;

- 226,932 tonnes of CO2 equivalent (total methane abated by gas capture system to date).
- 3,782,197 seedlings planted for 10 years
- 6,139 (cars off the road for the last 12 months)
- 92,714 Australian Carbon Credit Units
- Biogas captured is the cumulative flow reading at the last day of the month.



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## **PROJECT PROFILE: DUNMORE, NSW**

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**BIOGAS CAPTURED** 

24.2 million m3



**CARBON ABATEMENT** 

229 thousand tonnes (t CO2e - environmental benefit)



**ACCUs CREATED** 

92 thousand Australian Carbon Credit Units



SEEDLINGS PLANTED CARS OFF THE ROAD

3.8 million seedlings planted for 10 years (t CO2e)



6.214 for the last 12 months of carbon abatement (t CO2e)

#### **BIOGAS CAPTURE AND CARBON ABATEMENT FROM LANDFILL**

- Long-term contract with Shellharbour City Council to recover and beneficially use biogas and abate carbon from this regional landfill in Dunmore. This improves air quality, reduces greenhouse gas emissions and contributes to the local economy.
- No regulatory requirement to capture biogas, however ACCUs enable additional carbon abatement (above its 30% baseline) • from a commercially viable flaring project under the Emissions Reduction Fund (ERF).
- Since 2013, LGI has installed a bespoke biogas management system with an LGI 1000 ERF compliant biogas flare. Council • benefits from this bespoke system at minimal cost.
- LGI collaborates closely with the Council regarding the design, installation, operations and maintenance of the biogas • management system, including the monitoring and reporting services provided.

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| Site:         | Dunmore                   | Report issue date: | 17/02/2022  |
|---------------|---------------------------|--------------------|-------------|
| Report month: | January 2023              | Prepared by:       | Grace Tap   |
| Prepared for: | Shellharbour City Council | Checked by:        | Matthew Tap |

| O amonto ant        |   |
|---------------------|---|
| Comments on         | • January 2016 - LGI disconnected the 4 lateral wells and 8 vertical wells.                             |
| changes to existing | • April 2016 - LGI reconnected 8 vertical wells in the SE corner and 4 lateral wells.                   |
| system:             | • June 2016 - LGI disconnected the extended gas capture system to assist council.                       |
|                     | • September 2016 - LGI disconnected the extended gas capture system to assist council.                  |
|                     | <ul> <li>November 2016 - LGI commissioned the connection to leachate sump 6 as of</li> </ul>            |
|                     | 23-11-2016.   |
|                     | <ul> <li>May 2017 - LGI installed an additional 10 vertical wells to the existing LFG system</li> </ul> |
|                     | • November 2019 - LGI on site to move mainline up batter, and reconnected infrastructure                |
|                     | that had been previously disconnected, including 4 wells on the dimple and a 160mm                      |
|                     | leachate riser.   |
|                     | <ul> <li>April 2020 - LGI installed a flowline to sump 6 after earlier disconnection.</li> </ul>        |
|                     | <ul> <li>February 2021 - LGI installed 13 new vertical wells, including a new submain</li> </ul>        |
|                     | • March 2022 - LGI replaced the flare gas analyser panel with a Draeger model analyser                  |
|                     | for greater accuracy and reliability  |
|                     | August 2022 - LGI repaired the 225mm mainline and and adjacent sub main to allow for                    |
|                     | intermediate capping to continue across the top of cell 3   |
|                     | - December 2022 - LGI installed a pneumatic bore pump in a J-trap, allowing for greater                 |
|                     | reliability of condensate management in the main gas line.  |
| Comments on         | Availability - 100.00%  |
| operation /         | Down Time: 0.00hrs  |
| maintenance:        |   |
|                     |   |
|                     | Field Tuned:  |
|                     | - 24/01/2023  |
| Recommendations:    | After discussion with Council, LGI will re investigate options for leachate pumping out of              |
|                     | gas extraction wells  |
|                     |   |
|                     |   |

#### Flare Operational Data:

| Date       | CH4 % | CO2 % | O2 % | FLOW m3/h | STACK TEMP C | CUMULATIVE FLOW m3 |
|------------|-------|-------|------|-----------|--------------|--------------------|
| 04/01/2023 | 35    | -     | 1    | 346       | 769          | 23,924,491         |
| 11/01/2023 | 35    | -     | 1    | 350       | 749          | 23,981,011         |
| 24/01/2023 | 38.3  | 29.3  | 1.6  | 416       | 870          | 24,089,024         |
| Average    | 36.1  | 29.3  | 1.2  | 371       | 796          | -                  |





#### Dunmore- Methane, Carbon Dioxide & Oxygen





Date

#### **BIOGAS MONTHLY REPORT - DUNMORE**



# 25,000,000 20,000,000 15,000,000 5,000,000 0 2016 2018 2020 2022

#### **Dunmore - Cumulative Flow**

Year

- 24,156,649 of combusted landfill gas up to 1 February 2023, which represents;

- 229,430 tonnes of CO2 equivalent (total methane abated by gas capture system to date).
- 3,823,836 seedlings planted for 10 years
- 6,214 (cars off the road for the last 12 months)
- 92,714 Australian Carbon Credit Units
- Biogas captured is the cumulative flow reading at the last day of the month.

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Page 4 of 5



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# **PROJECT PROFILE: DUNMORE, NSW**

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**BIOGAS CAPTURED** 

24.4 million m3



**CARBON ABATEMENT** 

232 thousand tonnes (t CO2e - environmental benefit)



**ACCUs CREATED** 

92 thousand Australian Carbon Credit Units

SEEDLINGS PLANTED CARS OFF THE ROAD

3.9 million seedlings planted for 10 years (t CO2e)

6.229 for the last 12 months of carbon abatement (t CO2e)

#### **BIOGAS CAPTURE AND CARBON ABATEMENT FROM LANDFILL**

- Long-term contract with Shellharbour City Council to recover and beneficially use biogas and abate carbon from this regional landfill in Dunmore. This improves air quality, reduces greenhouse gas emissions and contributes to the local economy.
- No regulatory requirement to capture biogas, however ACCUs enable additional carbon abatement (above its 30% baseline) • from a commercially viable flaring project under the Emissions Reduction Fund (ERF).
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| Site:         | Dunmore                   | Report issue date: | 17/03/2023     |
|---------------|---------------------------|--------------------|----------------|
| Report month: | February 2023             | Prepared by:       | Grace Tap      |
| Prepared for: | Shellharbour City Council | Checked by:        | Thomas Schnatz |

| Comments on         | • January 2016 - LGI disconnected the 4 lateral wells and 8 vertical wells.                             |
|---------------------|---|
| changes to existing | <ul> <li>April 2016 - LGI reconnected 8 vertical wells in the SE corner and 4 lateral wells.</li> </ul> |
| system:             | • June 2016 - LGI disconnected the extended gas capture system to assist council.                       |
|                     | • September 2016 - LGI disconnected the extended gas capture system to assist council.                  |
|                     | <ul> <li>November 2016 - LGI commissioned the connection to leachate sump 6 as of</li> </ul>            |
|                     | 23-11-2016.   |
|                     | <ul> <li>May 2017 - LGI installed an additional 10 vertical wells to the existing LFG system</li> </ul> |
|                     | • November 2019 - LGI on site to move mainline up batter, and reconnected infrastructure                |
|                     | that had been previously disconnected, including 4 wells on the dimple and a 160mm                      |
|                     | leachate riser.   |
|                     | <ul> <li>April 2020 - LGI installed a flowline to sump 6 after earlier disconnection.</li> </ul>        |
|                     | • February 2021 - LGI installed 13 new vertical wells, including a new submain                          |
|                     | • March 2022 - LGI replaced the flare gas analyser panel with a Draeger model analyser                  |
|                     | for greater accuracy and reliability  |
|                     | • August 2022 - LGI repaired the 225mm mainline and and adjacent submain to allow for                   |
|                     | intermediate capping to continue across the top of cell 3   |
|                     | • December 2022 - LGI installed a pneumatic bore pump in a jtrap, allowing for greater                  |
|                     | reliability of condensate management in the main gas line.  |
|                     |   |
| Comments on         | Availability - 95.92%   |
| operation /         | Down Time: 27.42hrs   |
| maintenance:        | 23.75hrs - Forced Outage Internal - internal equipment fault  |
|                     | 3.58 hrs - Planned outage - equipment repairs   |
|                     |   |
|                     |   |
|                     | Field Tuned:  |
|                     | - 24/02/2023  |
| Recommendations:    | After discussion with Council, LGI will re investigate options for leachate pumping out of              |
|                     | gas extraction wells  |
|                     |   |
|                     |   |

#### Flare Operational Data:

| Date       | CH4 % | CO2 % | O2 % | FLOW m3/h | STACK TEMP C | CUMULATIVE FLOW m3 |
|------------|-------|-------|------|-----------|--------------|--------------------|
| 24/02/2023 | 40.6  | 26.5  | 0.2  | 350       | 790          | 24,335,619         |
| Average    | 40.6  | 26.5  | 0.2  | 350       | 790          | -                  |











#### **BIOGAS MONTHLY REPORT - DUNMORE**



# $rac{25,000,00}{20,000,00}$ $rac{15,000,000}{5,000,000}$ $rac{10}{216}$ $rac{10}{218}$ $rac{10}{202}$ $rac{10}{202}$

#### **Dunmore - Cumulative Flow**

- 24,378,789 of combusted landfill gas up to 1 March 2023, which represents;

- 231,540 tonnes of CO2 equivalent (total methane abated by gas capture system to date).
- 3,859,000 seedlings planted for 10 years
- 6,229 (cars off the road for the last 12 months)
- 92,714 Australian Carbon Credit Units
- Biogas captured is the cumulative flow reading at the last day of the month.



This report has been prepared by LGI Limited (LGI) with all reasonable skill, care and diligence, and taking account of the human power and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

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# **PROJECT PROFILE: DUNMORE, NSW**

We expedite the transition to renewables with clean energy and carbon abatement solutions. Carbon credits enable a commercially viable project to create additional abatement. **Results Achieved since the Project Commenced\*** 



**BIOGAS CAPTURED** 

24.6 million m3



**CARBON ABATEMENT** 

234 thousand tonnes (t CO2e - environmental benefit)



**ACCUs CREATED** 

92 thousand Australian Carbon Credit Units



SEEDLINGS PLANTED CARS OFF THE ROAD

3.9 million seedlings planted for 10 years (t CO2e)



6.304 for the last 12 months of carbon abatement (t CO2e)

#### **BIOGAS CAPTURE AND CARBON ABATEMENT FROM LANDFILL**

- Long-term contract with Shellharbour City Council to recover and beneficially use biogas and abate carbon from this regional landfill in Dunmore. This improves air quality, reduces greenhouse gas emissions and contributes to the local economy.
- No regulatory requirement to capture biogas, however ACCUs enable additional carbon abatement (above its 30% baseline) • from a commercially viable flaring project under the Emissions Reduction Fund (ERF).
- Since 2013, LGI has installed a bespoke biogas management system with an LGI 1000 ERF compliant biogas flare. Council • benefits from this bespoke system at minimal cost.
- LGI collaborates closely with the Council regarding the design, installation, operations and maintenance of the biogas • management system, including the monitoring and reporting services provided.

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| Site:         | Dunmore                   | Report issue date: | 18/04/2023   |
|---------------|---------------------------|--------------------|--------------|
| Report month: | March 2023                | Prepared by:       | Grace Tap    |
| Prepared for: | Shellharbour City Council | Checked by:        | Jarryd Doran |

| Comments on             | <ul> <li>January 2016 - LGI disconnected the 4 lateral wells and 8 vertical wells.</li> </ul>           |
|-------------------------|---|
| changes to existing     | <ul> <li>April 2016 - LGI reconnected 8 vertical wells in the SE corner and 4 lateral wells.</li> </ul> |
| system:                 | <ul> <li>June 2016 - LGI disconnected the extended gas capture system to assist council.</li> </ul>     |
|                         | • September 2016 - LGI disconnected the extended gas capture system to assist council.                  |
|                         | <ul> <li>November 2016 - LGI commissioned the connection to leachate sump 6 as of</li> </ul>            |
|                         | 23-11-2016.   |
|                         | <ul> <li>May 2017 - LGI installed an additional 10 vertical wells to the existing LFG system</li> </ul> |
|                         | • November 2019 - LGI on site to move mainline up batter, and reconnected infrastructure                |
|                         | that had been previously disconnected, including 4 wells on the dimple and a 160mm                      |
|                         | leachate riser.   |
|                         | <ul> <li>April 2020 - LGI installed a flowline to sump 6 after earlier disconnection.</li> </ul>        |
|                         | • February 2021 - LGI installed 13 new vertical wells, including a new submain                          |
|                         | • March 2022 - LGI replaced the flare gas analyser panel with a Draeger model analyser                  |
|                         | for greater accuracy and reliability  |
|                         | • August 2022 - LGI repaired the 225mm mainline and and adjacent sub main to allow for                  |
|                         | intermediate capping to continue across the top of cell 3   |
|                         | • <b>December 2022</b> - LGI installed a pneumatic bore pump in a jtrap, allowing for greater           |
|                         | reliability of condensate management in the main gas line.  |
| Comments on             | Availability - 100.00%  |
| operation /             | Down Time: 0.00hrs  |
| maintenance:            |   |
|                         |   |
|                         | Field Tuned:  |
|                         | - 01/03/2023  |
|                         | - 31/03/2023  |
| <b>Recommendations:</b> | After discussion with Council, LGI will re-investigate options for leachate pumping out of              |
|                         | gas extraction wells. We anticipate being on site to upgrade leachate infrastructure in May             |
|                         | 2023.   |
|                         |   |

#### Flare Operational Data:

| Date       | CH4 % | CO2 % | O2 % | FLOW m3/h | STACK TEMP C | CUMULATIVE FLOW m3 |
|------------|-------|-------|------|-----------|--------------|--------------------|
| 01/03/2023 | 40.0  | 26.8  | 0.2  | 377       | 682          | 24,383,436         |
| 10/03/2023 | 34.0  | -     | 0    | 373       | 615          | 24,462,664         |
| 16/03/2023 | 38.0  | -     | 0    | 342       | 696          | 24,514,505         |
| 31/03/2023 | 39.6  | 30.1  | 0.4  | 358       | 700          | 24,642,826         |
| Average    | 37.9  | 28.45 | 0.15 | 363       | 673          | -                  |



#### Dunmore- Methane, Carbon Dioxide & Oxygen



Damaged infrastructure on 02/09/2022 has allowed an influx of oxygen into the field causing readings of high O2 and low CH4.



#### **Dunmore - Flow Rate**

#### **BIOGAS MONTHLY REPORT - DUNMORE**



#### Dunmore - Cumulative Flow



- 24,647,231 of combusted landfill gas up to 1 April 2023, which represents;

- 234,090 tonnes of CO2 equivalent (total methane abated by gas capture system to date).
- 3,901,492 seedlings planted for 10 years
- 6,304 (cars off the road for the last 12 months)
- 92,714 Australian Carbon Credit Units
- Biogas captured is the cumulative flow reading at the last day of the month.



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# **PROJECT PROFILE: DUNMORE, NSW**

We expedite the transition to renewables with clean energy and carbon abatement solutions. Carbon credits enable a commercially viable project to create additional abatement.

#### **Results achieved since project commencement\***



**BIOGAS CAPTURED** 

25.2 million m<sup>3</sup>



**CARBON ABATEMENT** 239 thousand tonnes benefit)



**ACCUs CREATED** 

92 thousand (t CO<sub>2</sub>e - environmental Australian Carbon Credit seedlings planted for 10 Units (ACCUs)



SEEDLINGS PLANTED

4 million years (t  $CO_2e$ )



**CARS OFF THE ROAD** 

6.467 for the last 12 months of carbon abatement  $(t CO_2 e)$ 

#### **BIOGAS CAPTURE AND CARBON ABATEMENT FROM LANDFILL**

- Long-term contract with Shellharbour City Council to recover and beneficially use biogas and abate carbon from this regional • landfill in Dunmore. This improves air quality, reduces greenhouse gas emissions and contributes to the local economy.
- No regulatory requirement to capture biogas, however ACCUs enable additional carbon abatement (above its 30% baseline) ۲ from a commercially viable flaring project under the Emissions Reduction Fund (ERF).
- Since 2013, LGI has installed a bespoke biogas management system with an LGI 1000 ERF compliant biogas flare. Council • benefits from this bespoke system at minimal cost.
- LGI collaborates closely with the Council regarding the design, installation, operations and maintenance of the biogas • management system, including the monitoring and reporting services provided.

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| Site: Dunmore |                           | Report issue date: | 14/06/2023 |
|---------------|---------------------------|--------------------|------------|
| Report month: | May 2023                  | Prepared by:       | V McKay    |
| Prepared for: | Shellharbour City Council | Checked by:        | T Schnatz  |

| Comments on         | • January 2016 - LGI disconnected the 4 lateral wells and 8 vertical wells.                             |  |  |  |
|---------------------|---|--|--|--|
| changes to existing | <ul> <li>April 2016 - LGI reconnected 8 vertical wells in the SE corner and 4 lateral wells.</li> </ul> |  |  |  |
| system:             | • June 2016 - LGI disconnected the extended gas capture system to assist Council.                       |  |  |  |
|                     | • September 2016 - LGI disconnected the extended gas capture system to assist Council.                  |  |  |  |
|                     | • November 2016 - LGI commissioned the connection to leachate sump 6 as of                              |  |  |  |
|                     | 23-11-2016.   |  |  |  |
|                     | • May 2017 - LGI installed an additional 10 vertical wells to the existing LFG system                   |  |  |  |
|                     | • November 2019 - LGI on site to move mainline up batter, and reconnected                               |  |  |  |
|                     | infrastructure that had been previously disconnected, including 4 wells on the dimple and               |  |  |  |
|                     | a 160mm leachate riser.   |  |  |  |
|                     | • April 2020 - LGI installed a flowline to sump 6 after earlier disconnection.                          |  |  |  |
|                     | • February 2021 - LGI installed 13 new vertical wells, including a new submain                          |  |  |  |
|                     | • March 2022 - LGI replaced the flare gas analyser panel with a Draeger model analyser                  |  |  |  |
|                     | for greater accuracy and reliability  |  |  |  |
|                     | • August 2022 - LGI repaired the 225mm mainline and and adjacent submain to allow for                   |  |  |  |
|                     | intermediate capping to continue across the top of cell 3   |  |  |  |
|                     | • December 2022 - LGI installed a pneumatic bore pump in a j-trap, allowing for greater                 |  |  |  |
|                     | reliability of condensate management in the main gas line.  |  |  |  |
|                     | • May 2023 - LGI installed a series of 3 pneumatic bore pumps at various wells with                     |  |  |  |
|                     | evacuated leachate being returned into sump 5.  |  |  |  |
| Comments on         | Availability - 99.83 %  |  |  |  |
| operation /         | Down Time: 1.25 h   |  |  |  |
| maintenance:        | 1.25 h - Planned maintenance  |  |  |  |
|                     |   |  |  |  |
|                     | Field Tuned:  |  |  |  |
|                     | - 30/05/2023  |  |  |  |
| Recommendations     | LGL recommends continued regular communication with Council regarding leachate                          |  |  |  |
|                     | management site performance and future planning   |  |  |  |
|                     | management, elle performanee, una latare planning.  |  |  |  |

#### FLARE OPERATIONAL DATA (based upon on-site technical readings):

| Date       | CH4<br>(%v/v) | CO2<br>(%v/v) | O2<br>(%v/v) | FLOW<br>(m3/h) | STACK TEMP<br>(°C) | CUMULATIVE FLOW<br>(m3) |
|------------|---------------|---------------|--------------|----------------|--------------------|-------------------------|
| 11/05/2023 | -             | -             | -            | 360            | 580                | 24,991,860              |
| 18/05/2023 | -             | -             | -            | 356.9          | 609                | 25,052,697              |
| 23/05/2023 | 34            | -             | -            | 359            | 591                | 25,099,144              |
| 29/05/2023 | 34.2          | 27.9          | 0.5          | 521            | 969                | 25,148,776              |
| Average    | 34.1          | 27.9          | 0.5          | 399            | 687                | -                       |





Note: Infrastructure damage on 02/09/2022 resulted in oxygen ingress into the field



LGI Limited 57 Harvey St N, Eagle Farm QLD 4009

07 3711 2225





#### 25,176,026 m<sup>3</sup> of combusted landfill gas up to 1 June 2023, which represents;

- 239,112 tonnes of CO<sub>2</sub> equivalent (total methane abated by gas capture system to date).
- 3,985,197 seedlings planted for 10 years
- 6,467 (cars off the road for the last 12 months)
- 92,714 Australian Carbon Credit Units (ACCUs)

#### Biogas captured is the cumulative flow reading at the last day of the month.



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# **PROJECT PROFILE: DUNMORE, NSW**

We are people engineering a clean energy, zero carbon future, achieving our mission of expediting the transformation to renewables by delivering clean energy and lower carbon solutions, reliably, effectively, commercially for our customers.

To achieve our vision and mission we put people first and this makes us different from all the rest.

#### **Results achieved since project commencement\***



**BIOGAS CAPTURED** 

25.4 million m<sup>3</sup>



241 thousand tonnes (t CO<sub>2</sub>-e - environmental benefit)

**CARBON ABATEMENT** 



ACCUs CREATED

92 thousand Australian Carbon Credit Units (ACCUs)



4 million

seedlings planted for

10 years (t CO<sub>2</sub>-e)

SEEDLINGS PLANTED CARS OFF THE ROAD

6,388 for the last 12 months of carbon abatement (t CO<sub>2</sub>-e)

#### **BIOGAS CAPTURE AND CARBON ABATEMENT FROM LANDFILL**

- Long-term contract with Shellharbour City Council to recover and beneficially use biogas and abate carbon from this regional landfill in Dunmore. This improves air quality, reduces greenhouse gas emissions and contributes to the local economy.
- No regulatory requirement to capture biogas, however ACCUs enable additional carbon abatement (above its **30% baseline**) from a commercially viable flaring project under the Emissions Reduction Fund (ERF).
- Since 2013, LGI has installed a bespoke biogas management system with an LGI 1000 ERF compliant biogas flare. Council benefits from this bespoke system at minimal cost.
- LGI collaborates closely with the Council regarding the design, installation, operations and maintenance of the biogas management system, including the monitoring and reporting services provided.

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| Site: Dunmore |                           | Report issue date: | 12/07/2023 |
|---------------|---------------------------|--------------------|------------|
| Report month: | June 2023                 | Prepared by:       | V McKay    |
| Prepared for: | Shellharbour City Council | Checked by:        | T Schnatz  |

| Comments on             | • January 2016 - LGI disconnected the 4 lateral wells and 8 vertical wells.                      |
|-------------------------|--|
| changes to existing     | • April 2016 - LGI reconnected 8 vertical wells in the SE corner and 4 lateral wells.            |
| system:                 | • June 2016 - LGI disconnected the extended gas capture system to assist Council.                |
|                         | • September 2016 - LGI disconnected the extended gas capture system to assist Council.           |
|                         | • November 2016 - LGI commissioned the connection to leachate sump 6 as of                       |
|                         | 23-11-2016.  |
|                         | • May 2017 - LGI installed an additional 10 vertical wells to the existing LFG system            |
|                         | • November 2019 - LGI on site to move mainline up batter, and reconnected                        |
|                         | infrastructure that had been previously disconnected, including 4 wells on the dimple and        |
|                         | a 160mm leachate riser.  |
|                         | <ul> <li>April 2020 - LGI installed a flowline to sump 6 after earlier disconnection.</li> </ul> |
|                         | • February 2021 - LGI installed 13 new vertical wells, including a new submain                   |
|                         | • March 2022 - LGI replaced the flare gas analyser panel with a Draeger model analyser           |
|                         | for greater accuracy and reliability   |
|                         | August 2022 - LGI repaired the 225mm mainline and and adjacent submain to allow for              |
|                         | intermediate capping to continue across the top of cell 3  |
|                         | • December 2022 - LGI installed a pneumatic bore pump in a j-trap, allowing for greater          |
|                         | reliability of condensate management in the main gas line.                                       |
|                         | • May 2023 - LGI installed a series of 3 pneumatic bore pumps at various wells with              |
|                         | evacuated leachate being returned into sump 5.   |
| Comments on             | Availability - 84.99 %   |
| operation /             | Down Time: 108.08 h  |
| maintenance:            | 0.17 h - Planned maintenance (attempted TC repair)   |
|                         | 53.58 h - Forced outage external (mains failure)   |
|                         | 54.33 h - Forced outage internal (TC fault)  |
|                         |  |
|                         | Field tuned:   |
|                         | - 01/06/2023   |
|                         | - 10/06/2023   |
|                         | - 30/06/2023   |
| <b>Recommendations:</b> | LGI recommends continued regular communication with Council regarding leachate                   |
|                         | management, site performance and future planning.  |

#### FLARE OPERATIONAL DATA (based upon on-site technical readings):

| Date       | CH₄<br>(%v/v) | CO <sub>2</sub><br>(%v/v) | O <sub>2</sub><br>(%v/v) | FLOW<br>(m³/h) | STACK TEMP<br>(°C) | CUMULATIVE FLOW<br>(m <sup>3</sup> ) |
|------------|---------------|---------------------------|--------------------------|----------------|--------------------|--------------------------------------|
| 10/06/2023 | 37.1          | 27.3                      | 0.6                      | 345            | 711                | 25,270,471                           |
| 16/06/2023 | 31.0          | -                         | -                        | 328            | 650                | 25,314,777                           |
| 27/06/2023 | 33.3          | 25.0                      | 1.8                      | 322            | 636                | 25,383,280                           |
| 30/06/2023 | 39.7          | 30.6                      | 0.9                      | 284            | 648                | 25,396,318                           |
| Average    | 35.3          | 27.6                      | 1.1                      | 320            | 661                | -                                    |





Note: Infrastructure damage on 02/09/2022 resulted in oxygen ingress into the field







#### 25,400,015 m<sup>3</sup> of combusted landfill gas from the beginning of the project up to 1 July 2023 represents:

- 241,239 tonnes of CO<sub>2</sub> equivalent (total methane abated by gas capture system to date).
- 4,020,653 seedlings planted for 10 years
- 6,388 (cars off the road for the last 12 months)
- 92,714 Australian Carbon Credit Units (ACCUs)

Biogas captured is the cumulative flow reading at the last day of the month.

#### Total biogas captured in the 2023 financial year (23FY Qlfg): 3,114,331 m<sup>3</sup>

Total carbon abatement from biogas captured in the 2023 financial year (23FY): 29,579 t CO<sub>2</sub>-e



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**BIOGAS CAPTURED** 

26.3 million m3



**CARBON ABATEMENT** 

250 thousand tonnes (t CO2e - environmental benefit)



**ACCUs CREATED** 

92 thousand Australian Carbon Credit Units (ACCUs)



SEEDLINGS PLANTED CARS OFF THE ROAD

6.017 for the last 12 months of carbon abatement (t CO2e)

4.2 million seedlings planted for 10 years (t CO2e)

#### **BIOGAS CAPTURE AND CARBON ABATEMENT FROM LANDFILL**

- Long-term contract with Shellharbour City Council to recover and beneficially use biogas and abate carbon from this regional landfill in Dunmore. This improves air quality, reduces greenhouse gas emissions and contributes to the local economy.
- No regulatory requirement to capture biogas, however ACCUs enable additional carbon abatement (above its 30% baseline) • from a commercially viable flaring project under the Emissions Reduction Fund (ERF).
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| Site:         | Dunmore                   | more Report issue date: 7 |                |
|---------------|---------------------------|---------------------------|----------------|
| Report month: | October 2023              | Prepared by:              | Grace Tap      |
| Prepared for: | Shellharbour City Council | Checked by:               | Brendan Fraser |

| Comments on             | January 2016 - LGI disconnected the 4 lateral wells and 8 vertical wells.                               |
|-------------------------|---|
| changes to existing     | • April 2016 - LGI reconnected 8 vertical wells in the SE corner and 4 lateral wells.                   |
| system:                 | • June 2016 - LGI disconnected the extended gas capture system to assist Council.                       |
| -                       | • September 2016 - LGI disconnected the extended gas capture system to assist Council.                  |
|                         | • November 2016 - LGI commissioned the connection to leachate sump 6 as of                              |
|                         | 23-11-2016.   |
|                         | <ul> <li>May 2017 - LGI installed an additional 10 vertical wells to the existing LFG system</li> </ul> |
|                         | • November 2019 - LGI on site to move mainline up batter, and reconnected infrastructure                |
|                         | that had been previously disconnected, including 4 wells on the dimple and a 160mm                      |
|                         | leachate riser.   |
|                         | <ul> <li>April 2020 - LGI installed a flowline to sump 6 after earlier disconnection.</li> </ul>        |
|                         | <ul> <li>February 2021 - LGI installed 13 new vertical wells, including a new submain</li> </ul>        |
|                         | • March 2022 - LGI replaced the flare gas analyser panel with a Draeger model analyser                  |
|                         | for greater accuracy and reliability  |
|                         | • August 2022 - LGI repaired the 225mm mainline and and adjacent submain to allow for                   |
|                         | intermediate capping to continue across the top of cell 3   |
|                         | • December 2022 - LGI installed a pneumatic bore pump in a j-trap, allowing for greater                 |
|                         | reliability of condensate management in the main gas line.  |
|                         | <ul> <li>May 2023 - LGI installed a series of 3 pneumatic bore pumps at various wells with</li> </ul>   |
|                         | evacuated leachate being returned into sump 5.  |
|                         | <ul> <li>June 2023 - LGI installed a series of 2 pneumatic bore pumps at various wells with</li> </ul>  |
|                         | evacuated leachate being returned into sump 5.  |
|                         | - October 2023 - LGI replaced the flare with a brand new flare of identical capacity. The               |
|                         | new flare has improved control systems, reliability and performance, and will be compliant              |
|                         | with current Type B Gas and Hazardous Area Zoning regulations.  |
| Comments on             | Availability - 82.27 %  |
| operation /             | Down Time: 131.92 h   |
| maintenance:            |   |
|                         | 32h - Planned Outage  |
|                         | 99.92h - Forced Outage External   |
|                         |   |
|                         | Field tuned:  |
|                         | - 04/10/2023  |
|                         | - 16/10/2023  |
|                         | - 26/10/2023  |
|                         | - 27/10/2023  |
|                         |   |
| <b>Recommendations:</b> | LGI recommends continued regular communication with Council regarding leachate                          |
|                         | management, site performance and future planning.   |



#### Flare Operational Data:

| Date       | CH4<br>(%v/v) | CO2<br>(%v/v) | O2<br>(%v/v) | FLOW<br>(m3/h) | STACK TEMP<br>(°C) | CUMULATIVE FLOW<br>(m3) |
|------------|---------------|---------------|--------------|----------------|--------------------|-------------------------|
| 04/10/2023 | 31.1          | 28.1          | 1.4          | 388            | 710                | 26,109,567              |
| 07/10/2023 | 33.1          | 30.7          | -            | 359            | 538                | 13,480,830              |
| 20/10/2023 | -             | -             | -            | 380            | 715                | 13,582,154              |
| 21/10/2023 | 31.8          | -             | -            | 350            | 629                | 26,230,880              |
| Average    | 32.0          | 29.4          | 1.4          | 369            | 648                | -                       |



#### Dunmore- Methane, Carbon Dioxide & Oxygen

Damaged infrastructure on 02/09/2022 has allowed an influx of oxygen into the field causing readings of high O2 and low CH4.





#### Dunmore - Flow Rate



#### **Dunmore - Cumulative Flow**



26,293,928 m3 of combusted landfill gas from the beginning of the project up to 1 November 2023 represents:

- 249,729 tonnes of CO2 equivalent (total methane abated by gas capture system to date).
- 4,162,154 seedlings planted for 10 years
- 6,017 (cars off the road for the last 12 months)
- 92,714 Australian Carbon Credit Units (ACCUs)

Biogas captured is the cumulative flow reading at the last day of the month.


## Please note:

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