



ANNUAL ENVIRONMENTAL MONITORING REPORT (AEMR) OCTOBER 2020

DUNMORE RECYCLING & WASTE DEPOT
44 BUCKLEYS ROAD,
DUNMORE, NSW, 2529

ENVIRONMENT PROTECTION LICENCE (EPL) 5984

Prepared For: **Shellharbour City Council**
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ENRS

ENVIRONMENT & NATURAL RESOURCE SOLUTIONS
108 Jerry Bailey Road, Shoalhaven Heads, NSW
T 02 4448 5490 E: projects@enrs.com.au
ABN 68 600 154 596 WWW.ENRS.COM.AU

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The project was conducted through close liaison with Shellharbour City Council (SCC) and ALS Environmental.

Author and Document Control

Written/Submitted by:	Reviewed / Approved by:
 Taite Beeston (BSc.) <i>Geologist & Environmental Consultant</i>	 Rohan Last (BSc. MSc) <i>Hydrogeologist & Environmental Scientist</i>

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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 2019-2020 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 Council (SC) 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.

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 are 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 2019-2020 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 2019-2020 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 including; BH-1c, BH-3, BH-4, BH-9, BH-12r, BH-13, BH-14, BH-15, BH-19r. This is considered to be consistent with historical values;
- Onsite surface water samples (SWP-1, SW-2, SWP-4 and SWP-5) over the monitoring period reported a single minor exceedance for pH above the ANZECC (2000) trigger values for 95% marine/freshwater;
- Downgradient Rocklow Creek surface water samples (SWC-Up, SWC-2, SWC-down and SWC-down 2) were generally reported within the adopted Site Assessment Criteria. Within the 2019-2020 monitoring period a single exceedance for ammonium was reported above the ANZECC (2000) guidelines in SWC-2. Subsequent sampling events reports satisfactory results in all Rocklow Creek sample locations;
- Surface gas methane monitoring reported satisfactory results all within the adopted assessment criteria;
- Dust deposition gauges recorded satisfactory results below the guidelines provided in AS3580.10.1. Monitoring should continue in accordance with EPL 5984 requirements;
- No non-compliances with the EPL were reported during the 2019-2020 annual monitoring period;
- Based on this review of the 2019-2020 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;
- Should any change in Site conditions or incident occur which causes a potential environmental impact, a suitable environmental professional should be engaged to further assess the Site and consider requirements for any additional monitoring; and

- This report must be read in conjunction with the attached Statement of Limitations.

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1.1 PROJECT BACKGROUND

1.1.1 Site History

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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).

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1.3 SCOPE OF WORK

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- Recommendations on improving the environmental performance of the facility including improvement to the monitoring program.

2.0 SITE DESCRIPTION

2.1 LOCATION

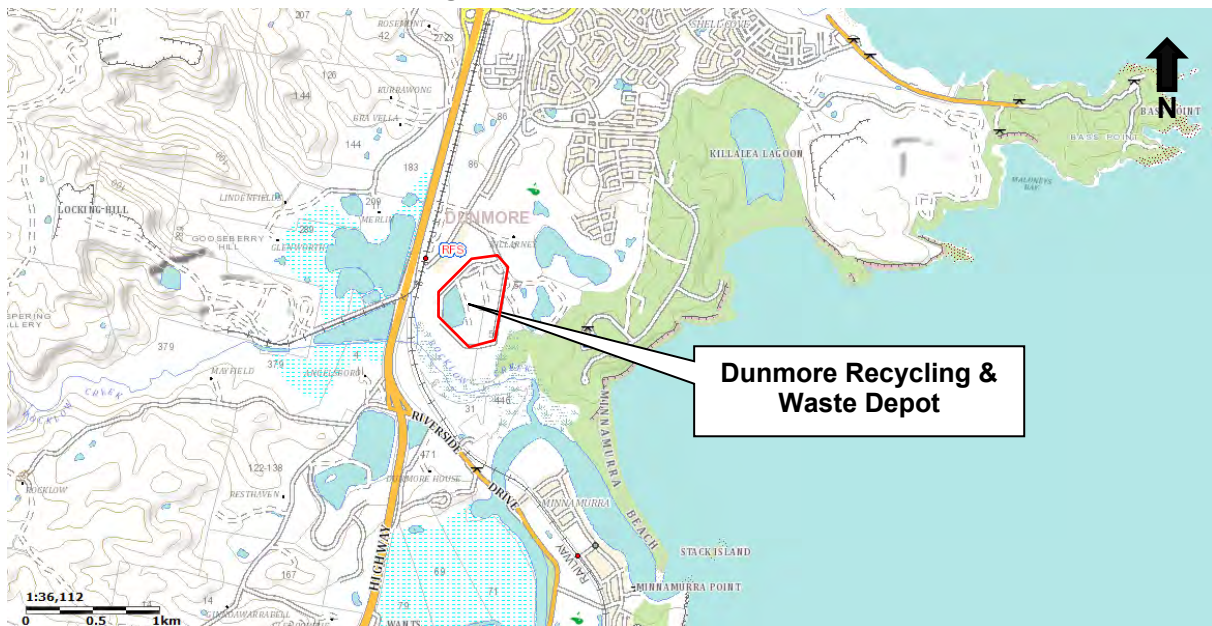
The Site is located at 44 Buckleys Road, Dunmore, NSW, 2529, legally defined as Lot 21 in Deposited Plan 653009 and Lot 1 Deposited Plan 419907. The Site is situated approximately three and a half (3.5) kilometres southwest of the Shellharbour town centre. The area’s regional location is defined in **Figure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

Table 1: Site Identification

Aspect	Description
Site	Dunmore Recycling and Waste Depot
Street Address	44 Buckleys Road, Dunmore, NSW 2529

Aspect	Description
Site Area	72.36 hectares
Title Identifier	Lot 21 DP 653009, Lot 1 DP 419907
Zoning	RU1 Primary Production
Local Government Area	Shellharbour City Council

Figure 1: Site Location Map



Source: SIX Maps (<https://maps.six.nsw.gov.au/>) (cited 16/01/2020)

2.2 SURROUNDING LANDUSE

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

Table 2: 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;
- Down gradient stakeholders; and
- Down gradient alluvial aquifers, swamps, Rocklow Creek, Minnamurra River and Groundwater Dependent Ecosystems (GDE) near discharge zones.

2.3 TOPOGRAPHY & DRAINAGE

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

The previous annual monitoring report (Environmental Earth Sciences 2018) reported the soil profile at the Site as 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 (ASS).

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. 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 are 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.

3.0 ASSESSMENT CRITERIA

3.1 CONTAMINANTS OF POTENTIAL CONCERN

This section of the report provides a summary of the Contaminants of Potential Concern (CoPC) associated with the Site. CoPC's are identified in the Sites EPL/s which document the CoPC and water quality indicators required to be monitored. Analytical requirements for all water sampling are provided in Appendix A.

3.2 WATER QUALITY GUIDELINES

Nationally developed guidelines are provided in the National Water Quality Management Strategy (NWQMS): Guidelines for Groundwater Protection in Australia (ARMCANZ & ANZECC 1995). For the purpose of this assessment, the relevant criteria selected to protect environmental values are summarised in **Table 3** below:

Table 3: Groundwater Assessment Criteria

Environmental Value	Relevant Guideline
Ecosystems / Health Screening Levels	ANZG (2018) (Australian and New Zealand Guidelines for Fresh and Marine Water Quality).
	National Environment Protection Measure (NEPM) (2013).
Drinking Water	Australian Drinking Water Guidelines (ADWG) (2018)

3.2.1 ANZECC Guidelines

The relevant criteria for this water quality assessment are the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG;2018). The ANZG (2018) provide Default Guideline Values (DGVs) for four (4) levels of protection categorised by the percentage of species possibly affected, being 80%, 90%, 95% or 99% of species. Values for a level of protection for 95% of species in a marine environment have been adopted and are displayed in **Table 4**. Where DGVs are not available reference is made against the ANZECC (2000) Trigger Values (TVs). 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**.

Table 4: Adopted Guideline Criteria

Parameter	Groundwater Guideline	Surface water Guideline
Ammonia	0.9 mg/L	0.9 mg/L
Nitrate	10.6 mg/L	10.6 mg/L
pH	6.5-8.0 pH units	6.5-8.0 pH units
Soluble Iron	0.3 mg/L	0.3 mg/L
Manganese	1.9 mg/L	1.9 mg/L

Parameter	Groundwater Guideline	Surface water Guideline
Electrical Conductivity	125-2200 µS/cm	125-2200 µS/cm

3.2.2 National Environmental Protection Measure (NEPM)

The NSW EPA has endorsed the use of the Groundwater Investigation Levels (GILs) given in the 2013 ASC NEPM ‘Schedule B(1) Guideline on the Investigation Levels for Soil and Groundwater’. The latest NEPM provide a framework for risk-based assessment of groundwater contamination.

Groundwater Health Screening Levels (HSLs) are provided for four (4) land use categories for vapour intrusion (Table 1A[4]) associated with Total Recoverable Hydrocarbons TRH (F1 & F2) and BTEX compounds.

NEPM	Description of Land use Categories
HIL A	Residential A with garden/accessible soil also includes children’s day care centres, preschools and primary schools.
HIL B	Residential B with minimal opportunities for soil access; includes buildings with fully and permanently paved yard space such as high-rise buildings and apartments.
HIL C	Recreational C includes public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary schools and unpaved footpaths.
HIL D	Commercial/industrial D includes premises such as shops, offices, factories and industrial sites.
GILs	Groundwater Investigation Levels (GILs) should be applied based on the receiving environment and groundwater resources. GILs are provided in NEPM Table 1C for; Fresh Waters; Marine Waters; and Drinking Water;
EILs	Ecological Investigation Levels (EILs) for common contaminants in the top two (2) metres of soil based on three (3) generic land use settings: <ul style="list-style-type: none"> • Areas of ecological significance; • Urban residential areas and public open space; and Commercial and industrial land uses.

3.3 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.

3.4 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.

4.0 SAMPLING METHODOLOGY

Field sampling was conducted by *ALS Environmental* (Wollongong) as commissioned by SCC in June 2020. ENRS understands that sampling was conducted in accordance with ALS sampling protocols with reference to current industry standards and Code of Practices. The following sub-sections provide a summary of the sampling methodologies.

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

4.1 WATER SAMPLING

4.1.1 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; eight (8) surface waters, located onsite and off-site; nine (9) groundwater monitoring wells surrounding the landfill operations; and two (2) leachate points. Sampling locations are illustrated in **Figure 2** attached.

4.1.2 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 identified in monitoring Wells.**

4.1.3 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 is conducted in accordance with *ALS* sampling protocols.

4.1.4 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 or low flow parameter stabilisation methods applied with field sheets provided to document pumping volumes and field parameters. Samples were collected using clear disposal bailers. and were sealed in laboratory-prepared sampling containers appropriate for the analysis. All samples were stored on ice immediately after their collection and transported to the laboratory under Chain of Custody (CoC) documentation.

Surface water and leachate samples were collected using as 'grab samples' from the midpoint of the structure and at mid-depth.

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.

4.1.5 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).

4.2 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. The 2019-2020 monitoring period was the first year of the four (4) dust monitoring points.

Dust collection gauges were set up for a one (1) month period between the dates; Q1 11/12/19-16/01/20; Q2 11/02/2020-10/03/2020; Q3 15/05/2020-17/06/2020; and Q4 14/08/2020-15/09/2020. A total of four (4) dust monitoring locations were considered adequate to assess site conditions.

4.3 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. Whenever possible the concentration of methane gas was also recorded in any buildings located within a distance of 250 m of the deposited waste. Any depressions or surface fissures away from the sampling grid were also investigated.

4.4 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.

5.0 QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC)

5.1 DATA QUALITY OBJECTIVES

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 by Australian Standard: AS 4482.1-2005 and referenced by the National Environment Protection (Assessment of Site Contamination) Measure (NEPC;2013). The DQO's for the investigation were to obtain representative data to allow assessment of:

- groundwater quality;
- The risks posed to human health and the environment, including potential future users of the Site; and
- The requirements for any further investigative works.

The assessment was conducted to a standard consistent with generally accepted and current professional consulting practice for such an investigation. The evaluation criteria adopted for the investigation are summarised in **Table 5**.

Table 5: Data Quality Objectives

DQO	Evaluation Criteria
Documentation completeness	Completion of field records, chain of custody documentation, laboratory test certificates from NATA-accredited laboratories.
Data comparability	Use of appropriate techniques for the sampling, storage and transportation of samples. Use of NATA accredited laboratory using NEPM endorsed procedures.
Data representativeness	Adequate sampling coverage of all areas of environmental concern at the Site, and selection of representative samples.

DQO	Evaluation Criteria
Precision and accuracy for sampling and analysis	Use properly trained and qualified field personnel and achieve field and laboratory QA/ QC criteria.

5.2 QA/QC PROCEDURES

Data provided for the purpose of this report by SC was prepared by ALS. ALS is NATA accredited for the laboratory testing. The QA/QC indicators as provided to ENRS either 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 environmental assessment. Therefore, the data is considered acceptable for use in this assessment.

It should be noted that whilst the EPL does not require field duplicates, ENRS recommend sampling include rinsate samples and field duplicates at the standard rate of 1 in 10, or field QA/QC is conducted in accordance with ALS procedures.

5.3 EPL NON-COMPLIANCE

Monitoring requirements are defined by the EPL. ENRS understand the 2019-2020 annual monitoring results identified no non-compliance with the terms of the EPL.

6.0 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 7 - Table 10** with comparison against the relevant Site Assessment Criteria (SAC). The laboratory certificates of analysis are provided in Appendix B.

6.1 OVERFLOW RESULTS

One (1) overflow event was recorded over the 2020 reporting period on the **10th August /2020**. Climate data taken from Albion Park (Shellharbour Airport) (068241) weather station recorded a total rainfall of 171.3mm over three days leading up the event (8,9,10/08/2020). Overflow was subsequently sampled by ALS at two locations and analysed for total suspended solids and pH. Laboratory certificates of analysis are provided in Appendix E. Results for total suspended solids (TSS) were reported below the lower limit of detection of <0.5 mg/L. pH recorded relatively natural results of 7.2 pH units at both sampling points. The results were considered satisfactory.

6.2 FIELD TESTING

Field testing is conducted by ALS during sampling to record physical water parameters. A water quality meter is used to measure the following parameters in the field:

- Electrical Conductivity (Salinity);
- pH (Acidity); and
- Dissolved Oxygen (surface waters only).

6.3 PHYSICAL INDICATORS

6.3.1 Salinity (EC & TDS)

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 $0.68 \text{ mg/L} = 0.68 \text{ EC } (\mu\text{S/cm})$. Table 3.3.3 of the ANZECC (2000) guidelines document default TV for EC in lowland freshwater rivers between $125 \mu\text{S/cm} - 2,200 \mu\text{S/cm}$ (~1,500 mg/L).

Groundwater

Salinity in groundwater is typically higher than surface water due to mineral dissolution. Groundwater salinity at the Site was generally reported above the freshwater SAC of $2,200 \mu\text{S/cm}$. Elevated results were reported in seven (7) of nine (9) groundwater bores during the 2019 - 2020 monitoring period, ranging between; **2,210 $\mu\text{S/cm}$** (BH-19r, 11/03/2020) and **10,400 $\mu\text{S/cm}$** (BH-15, 17/12/2019). Results are consistent with the previous 2020 quarterly monitoring events.

Leachate

Salinity in leachate is expected to vary significantly with leachate concentration and stormwater dilution. Leachate salinity for the 2019-2020 monitoring period ranged from **9,700 $\mu\text{S/cm}$** (LP1, 11/03/2020) and **16,600 $\mu\text{S/cm}$** (Sump, 17/12/2019) which are above the TV.

6.3.2 Dissolved Oxygen

Levels of Dissolved Oxygen (DO) were measured in the field during sampling. 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 sulfide and Ammonia.

The ANZECC (2000) 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.

Dissolved Oxygen for the 2019-2020 monitoring period were recorded for Leachate only and ranged from **0.13 mg/L** (Sump, 17/06/2020) and **7.43 mg/L** (LP1, 17/06/2020).

6.3.3 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).

Surface Water

Surface water for the 2019-2020 monitoring period reported pH values of between **pH 6.30** (SWP-1, 11/03/2020) and **pH 9.0** (SWP-4, 11/03/2020).

Groundwater

Groundwater pH was reported between **pH 5.6** (BH-3, 11/03/2020) and **pH 7.5** (BH-3, 17/06/2020). All groundwater results were reported within the ANZECC recommended range of pH 6.5-8.0. The results are largely within the historical range of values.

6.3.4 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 reported for surface water only. Concentrations for the 2019-2020 monitoring period were reported between **<5 mg/L** (SWC-up & SWC-2 17/12/2019, SWC-up 11/03/2020) and **160 mg/L** (SWC-down 2, 13/03/2020).

6.4 INORGANIC ANALYTES

6.4.1 Nutrients

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.

Ammonia

For the 2019-2020 monitoring period, ammonia was measured within groundwater monitoring bores between **0.04 mg/L** (BH14, 11/03/2020) and **380 mg/L** (BH-1c, 17/12/2019).

Ammonia was measured within groundwater monitoring bores between **0.42 mg/L** (BH-14) and **131 mg/L** (BH-1c). Throughout the monitoring period, all groundwater wells reported at least one (1) exceedance of the adopted trigger value of 0.91 mg/L. This is consistent with historical values.

Ammonia in leachate was reported between **59.60 mg/L** (LP1, 17/06/2020) and **1450 mg/L** (LP1, 17/12/2019). High ammonia concentrations are expected in untreated leachate.

Ammonium

Ammonium was measured at Rocklow Creek surface water monitoring locations. Throughout the 2019-2020 monitoring period ammonium was reported between **0.03 mg/L** (SWC-down 2, 17/12/2019) and **1.68 mg/L** (SWC-2, 17/06/2020). The SWC-2 result reported from the Q3 sampling event was the only exceedance of the adopted trigger value of 0.91 mg/L throughout the monitoring period.

Nitrate

Results for Nitrate in groundwater were reported between **<.01 mg/L** in multiple bores and **202 mg/L** (BH-14, 11/03/2020). A total of four (4) groundwater wells reported exceedances above the TV of 0.7mg/L throughout the 2019-2020 monitoring period, including BH-3, BH-12r, BH-13 and BH-14.

Nitrate in Rocklow Creek surface water and leachate samples were all reported below the TV of 0.7mg/L. The results are considered satisfactory.

6.4.2 Metals & Metalloids

Magnesium (Total Mg)

Magnesium was analysed in selected surface water samples. Concentrations of magnesium in surface water during the 2019-2020 monitoring period were reported between **8 mg/L** (SWP-1, 11/03/2020) and **1,420 mg/L** (SWC-down 2, 17/12/2020).

Manganese (Total Mn)

Manganese was analysed in groundwater and leachate sampling points. Concentrations of Manganese in groundwater for the 2019-2020 monitoring period were reported between **0.04 mg/L** (BH-3, 15/09/2020) and **1 mg/L** (BH-9, 17/06/2020). Leachate concentrations were reported between **0.41 mg/L** (Sump, 17/12/2019) and **0.672 mg/L** (Sump, 17/06/2020). These values are below the adopted TV (1.9 mg/L 95% of Species - freshwater) and are considered acceptable. Concentrations of Manganese should continue to be reviewed during subsequent monitoring events.

Iron (Total Fe)

Iron was measured in selected surface water samples including leachate onsite dams, leachate and . Concentrations of total iron within onsite surface water were reported between **0.07 mg/L** (SWP-2, 17/12/2019) and **3.3 mg/L** (SWP-1, 17/12/2019). Concentrations of total iron within Rocklow creek sampling locations were reported between the laboratory lower limit of detection of **<0.1-0.5 mg/L** and **10.5 mg/L** (SWC-down 2, 11/03/2020). Concentration of iron with leachate samples was reported between **0.69 mg/L** (Tank LP1, 17/06/2020) and **3.52 mg/L** (Tank LP1, 17/17/2019).

Iron (Dissolved Fe)

Dissolved iron was measured within selected groundwater and surface water sampling points. Groundwater results were reported between the laboratory lower limit of detection of **<0.05 mg/L** and **19.3 mg/L (BH15, 17/06/2020)**. Onsite surface water reported concentrations of dissolved iron the laboratory lower limit of detection and **1.31 mg/L (SWP-1, 17/06/2020)**.

Samples collected from Rocklow Creek generally reports results below the lower limit of reporting with a maximum detection of 0.11 mg/L (SWC-up, 15/09/2020).

6.5 ORGANIC ANALYTES

6.5.1 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.

TOC was reported during the 2019-2020 monitoring period at the following concentrations:

- Groundwater; between **11 mg/L** (BH-3; 11/03/2020) and **218 mg/L** (BH-1c; 17/12/2019);
- Surface Water; between **29 mg/L** (SWP-4; 11/03/2020) and **46 mg/L** (SWP-4; 17/12/2020)
- Leachate; **238 mg/L** (Sump; 17/06/2020) and **900 mg/L** (Sump; 17/12/2019).

7.0 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 sampling round, in general accordance with AS3580.10.1. A total of four (4) quarterly (Q) rounds were conducted over the 2019-2020 monitoring period; Q1 11/12/19-16/01/20; Q2 11/02/2020-10/03/2020; Q3 15/05/2020-17/06/2020; and Q4 14/08/2020-15/09/2020. A summary of results is provided in **Table 6** below.

Table 6: Summary of Dust Gauge Results

Sample ID	Guideline Criteria (g/m ² /month)	Total Insoluble Matter (g/m ² /month)			
		Q1	Q2	Q3	Q4
DDG1	4	7.4	1.2	0.6	0.2
DDG2		4.7	0.7	0.4	0.2
DDG3		7.7	1.8	0.8	1.1

Sample ID	Guideline Criteria (g/m ² /month)	Total Insoluble Matter (g/m ² /month)			
		Q1	Q2	Q3	Q4
DDG4		4.4	1.9	2.4	2.7

Results for depositional dust during the 2019-2020 annual monitoring period generally reported levels of dust below the adopted assessment criteria of **4 g/m²/month**. Exceedances were recorded in all sample locations within the Q1 sampling period. Specification by the laboratory of the Q1 dust contents identified large quantities of Ash. The Q1 sampling period occurred during high levels of smoke within the regional area. Given that no ash generation activities occur as part of Site operations, the results are considered satisfactory. Dust gauge locations are provided in **Figure 2** attached. It is recommended that monitoring is continued in accordance with EPL 5984.

8.0 SURFACE METHANE GAS RESULTS

The surface gas monitoring from the 2019-2020 monitoring period *DID NOT* detect any levels of methane above the EPA license limits of 500 ppm. The results are considered satisfactory. A table of results is provided in Appendix D.

9.0 ANNUAL ENVIRONMENTAL ASSESSMENT

9.1 MONITORING POINT SUMMARY

Field measurements and NATA laboratory results for dust and methane results from the annual 2019-2020 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 three (3) years have been tabulated and presented **Charts 1-83** attached.

Groundwater and surface water within the Site boundary generally reported multiple high levels of analytes considered to be characteristic of landfill and leachate. Offsite sample locations within Rocklow Creek generally reported satisfactory results. A single exceedance for ammonium was recorded in Rocklow Creek upstream sample SWC-2 on the 17th June 2020. Subsequent sampling on the 15th September 2020 reported satisfactory results for ammonium in SW-2. Results are considered to be consistent with historical monitoring events.

All dust gauges reported satisfactory results over the 2019-2020 monitoring period. Exceedances for dust during a single round of monitoring between 11/12/19-16/01/20 identified high ash loadings. Subsequent rounds reported satisfactory results.

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

9.2 ENVIRONMENTAL MANAGEMENT

9.2.1 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).

9.3 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 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.

9.4 MONITORING PROGRAM

The water, dust and surface methane monitoring program is required to demonstrate that Site activities are not generating any off-site pollution. The Site’s EPL’s and monitoring regime should be reviewed annually.

Review of the 2019-2020 monitoring results indicate no significant change in environmental conditions at the Site over the past three (3) years. Future sampling events should continue to monitor the key indicators of leachate within surface and ground 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 holding time.

10.0 CONCLUSIONS

Based on the findings obtained during the 2019-2020 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 including; BH-1c, BH-3, BH-4, BH-9, BH-12r, BH-13, BH-14, BH-15, BH-19r. This is considered to be consistent with historical values;
- Onsite surface water samples (SWP-1, SW-2, SWP-4 and SWP-5) over the monitoring period reported a single minor exceedance for pH above the ANZECC (2000) trigger values for 95% marine/freshwater;
- Downgradient Rocklow Creek surface water samples (SWC-Up, SWC-2, SWC-down and SWC-down 2) were generally reported within the adopted Site Assessment Criteria. Within the 2019-2020 monitoring period a single exceedance for ammonium was reported above the ANZECC (2000) guidelines in SWC-2. Subsequent sampling events reports satisfactory results in all Rocklow Creek sample locations;
- Surface gas methane monitoring reported satisfactory results all within the adopted assessment criteria;
- Dust deposition gauges recorded satisfactory results below the guidelines provided in AS3580.10.1. Monitoring should continue in accordance with EPL 5984 requirements;
- No non-compliances with the EPL were reported during the 2019-2020 annual monitoring period;
- Based on this review of the 2019-2020 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;
- 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.

11.0 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 the site.

ENRS derived the data in this report primarily from visual inspections, examination of available records, interviews with individuals with information about the site, and if requested, 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 the 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.

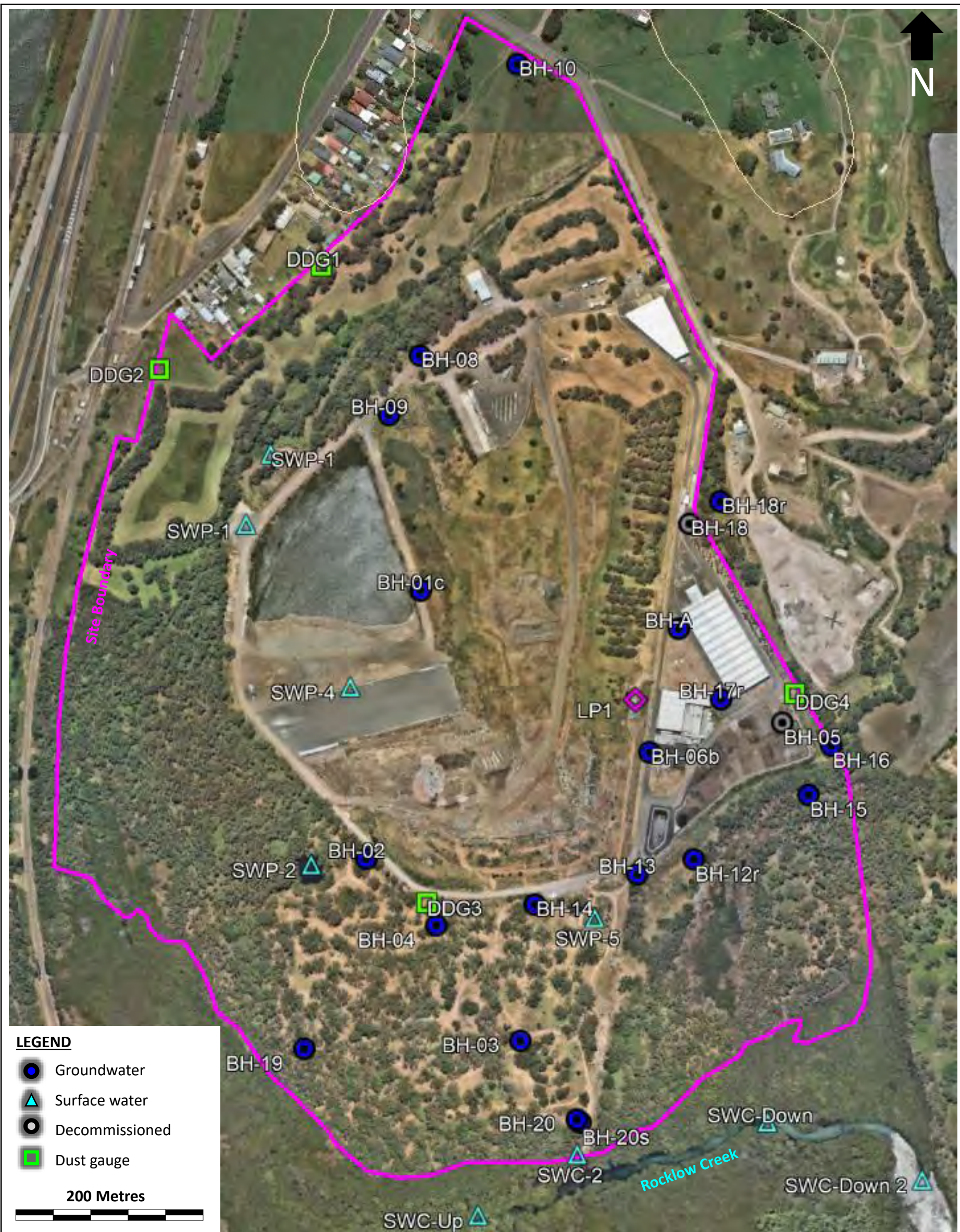
This report has been prepared on behalf of and for the exclusive use of the Client, and is subject to and issued in connection with the provisions of the agreement between ENRS and the Client. ENRS accepts no liability or responsibility whatsoever and expressly disclaims any responsibility for or in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

12.0 REFERENCES

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FIGURES



LEGEND

- Groundwater
- ▲ Surface water
- Decommissioned
- Dust gauge

200 Metres



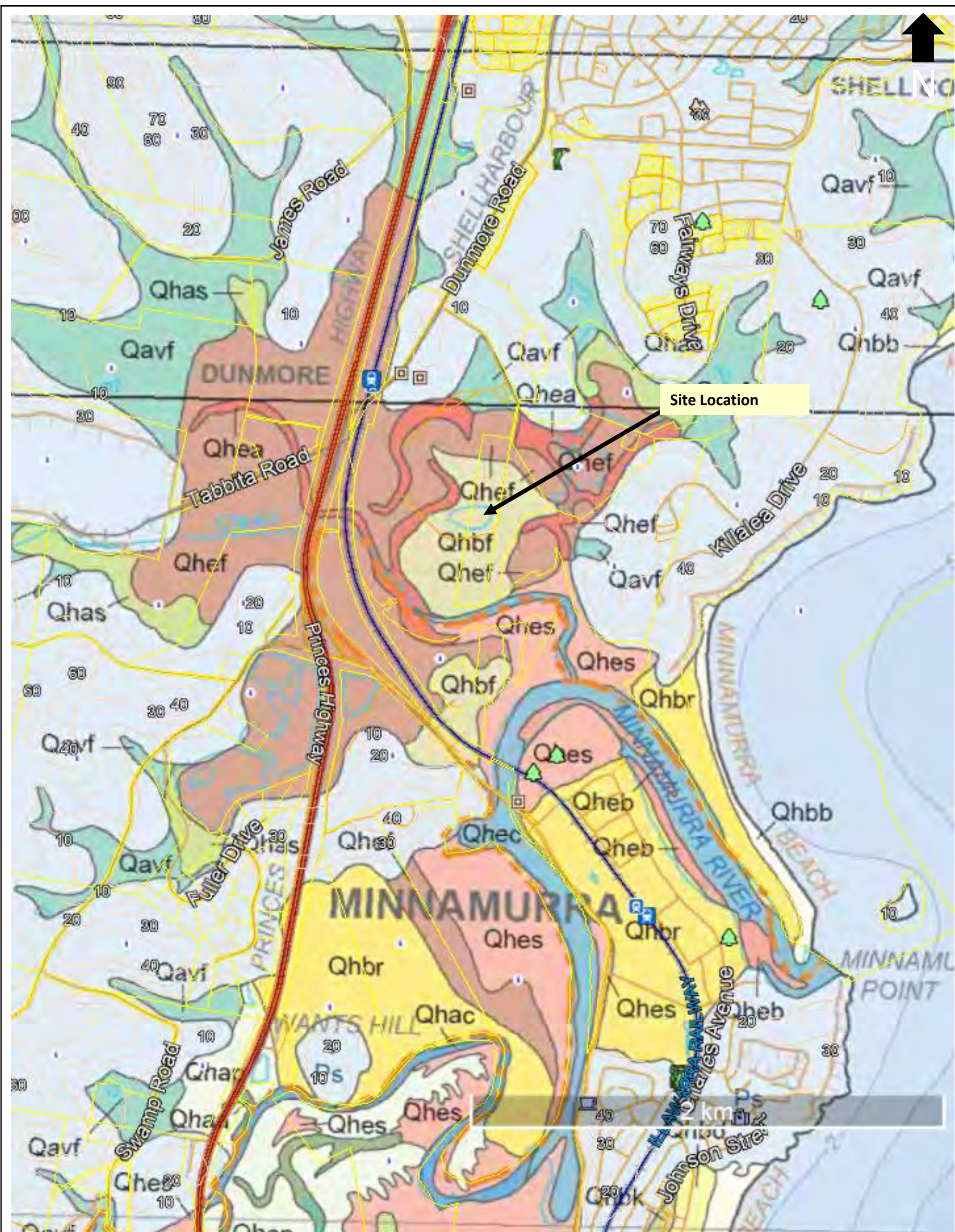
Environment & Natural Resource Solutions
 108 Jerry Bailey Road, Shoalhaven Heads, NSW, 2535
 Tel: 02 4448 5490 Fax: 02 90374708
projects@enrs.com.au www.enrs.com.au

Client:	Shellharbour City Council	Drawn:	PL	Figure:	2
Project:	ENRS0033	Source:	NearMaps	Date:	4/02/2020
Location:	Dunmore Recycling & Waste Depot 44 Buckleys Rd, Dunmore, NSW	Scale:	NA	Title:	Site Plan
		Status:	Rev 1		

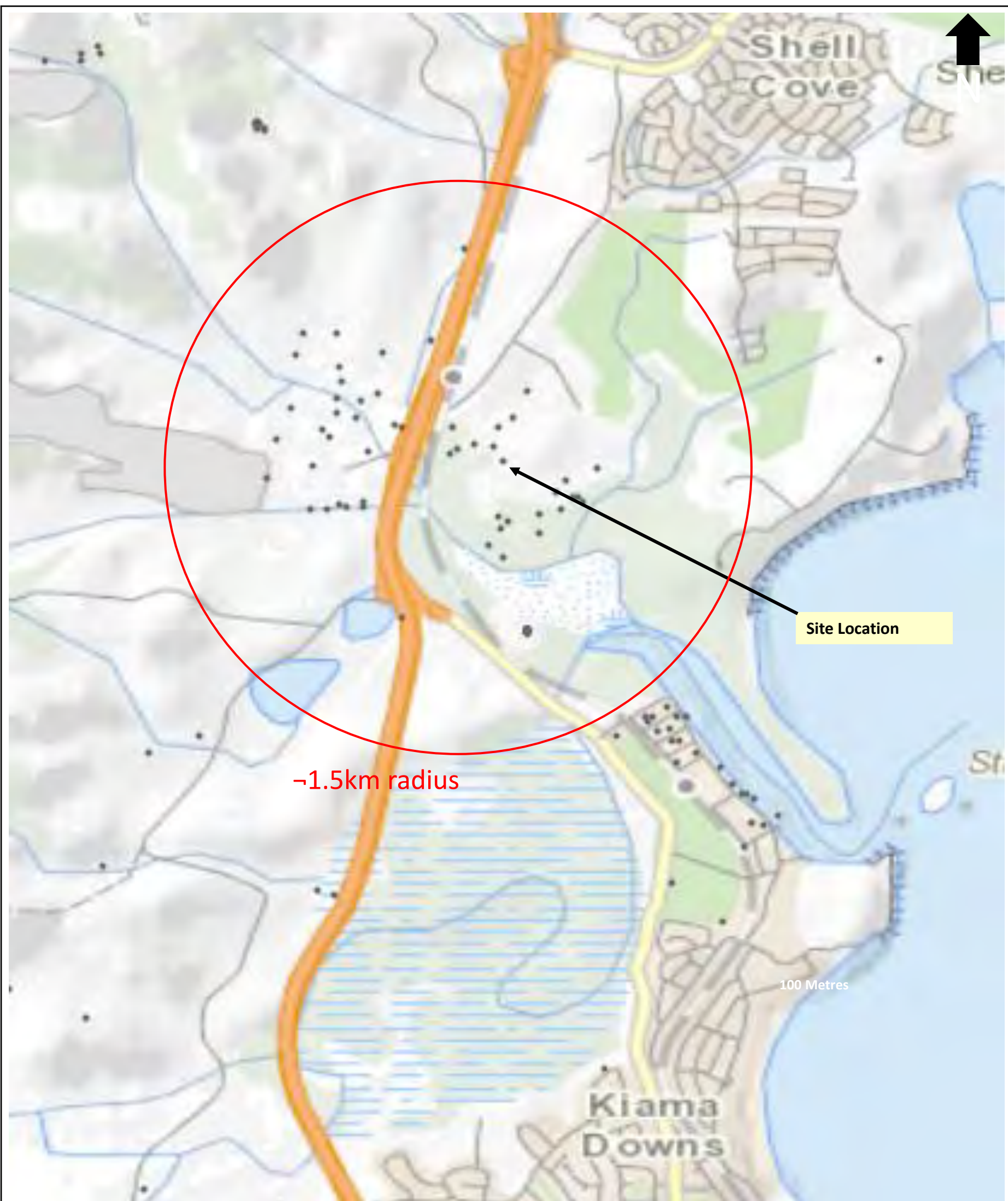


Environment & Natural Resource Solutions
 108 Jerry Bailey Road, Shoalhaven Heads, NSW, 2535
 Tel: 02 4448 5490 Fax: 02 90374708
projects@enrs.com.au www.enrs.com.au

Client:	Shellharbour City Council	Drawn:	PL	Figure:	3
Project:	ENRS0033	Source:	SixMaps	Date:	16/03/2020
Location:	Dunmore Recycling & Waste Depot 44 Buckleys Rd, Dunmore, NSW	Scale:	NA	Title:	Surface Gas Sample transects
		Status:	Rev 1		



ENRS Environment & Natural Resource Solutions 108 Jerry Bailey Road, Shoalhaven Heads, NSW, 2535 Tel: 02 4448 5490 Fax: 02 90374708 projects@enrs.com.au www.enrs.com.au	Client:	Shellharbour City Council	Drawn:	PL	Figure:	4
	Project:	ENRS0033	Source:	DPI	Date:	16/01/2020
	Location:	Dunmore Recycling & Waste Depot 44 Buckley's Rd, Dunmore, NSW	Scale:	NA	Title:	Geology
			Status:	Rev 1		



Client:	Shellharbour City Council	Drawn:	PL	Figure:	5
Project:	ENRS0033	Source:	SixMaps	Date:	16/01/2020
Location:	Dunmore Recycling & Waste Depot 44 Buckleys Rd, Dunmore, NSW	Scale:	NA	Title:	Registered Bores
		Status:	Rev 1		

TABLES

TABLE 7: Total Concentration Results
 Quarterly Water Monitoring Results - December 2019: Dunmore Recycling and Waste Depot

GILs - Trigger Values for Freshwater (Protection of 95% of Species) ^A		-	-	-	-	-	1.9	-	-	-	0.9 (pH 8)	0.9 (pH 8)	-	0.7	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.5 - 8.0	2200	-			
GILs - Trigger Values for Marine Water (Protection of 95% of Species) ^A		-	-	-	-	-	-	-	-	-	0.91 (pH 8)	0.91 (pH 8)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Australian Drinking Water Guidelines (2018) ^C		Health		-	-	-	-	-	0.5	-	-	1.5	-	-	3	50	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.5 - 8.0	-	-		
		Aesthetic		250	-	-	180	-	0.1	0.3	0.3	-	0.5	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.5 - 8.0	-	-		
Sample No.	Date Sampled	Chloride	Calcium	Magnesium	Sodium	Potassium	Manganese	Total Iron	Dissolved Iron	Fluoride	Ammonia as N	Ammonium as N	Nitrite as N	Nitrate as N	Nitrite + Nitrate as N	Total Organic Carbon	Biochemical Oxygen Demand	Hydroxide Alkalinity as CaCO3	Carbonate Alkalinity as CaCO3	Bicarbonate Alkalinity as CaCO3	Total Alkalinity as CaCO3	Sulfate as SO4 - Turbidimetric	Dissolved Oxygen	Dissolved Oxygen - % Saturation	Suspended Solids (SS)	Turbidity	Total Anions	Total Cations	Ionic Balance	pH	Electrical Conductivity	Temperature	Depth to Water (mbgl TOC)	Comments		
		Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	mg/L	NTU	meq/L	meq/L	meq/L	pH	µS/cm	°C	mbgl		
		Laboratory PQL	1	1	1	1	0.001	0.05	0.05	0.1	0.01	0.01	0.01	0.01	0.01	1	2	1	1	1	1	1	1	0.01	0.1	5	0.1	0.01	0.01	0.01	0.01	1	0.1	-	-	
Groundwater	BH-1c	17/12/2019	951	147	-	-	231	0.098	-	10.90	0.4	380.0	-	<0.01	<0.01	<0.01	218	-	<1	<1	2880	2880	<5	-	-	-	-	-	-	-	-	7	7360	22.9	3.72	-
	BH-3	17/12/2019	254	152	-	-	33	0.171	-	2.04	0.2	34.3	-	0.11	10.60	10.70	16	-	<1	<1	408	408	126	-	-	-	-	-	-	-	7.2	1800	19	3.3	-	
	BH-4	17/12/2019	200	183	-	-	18	0.252	-	4.08	0.1	6.1	-	<0.01	0.01	0.01	20	-	<1	<1	540	540	141	-	-	-	-	-	-	-	7.1	1730	18.8	4.56	-	
	BH-9	17/12/2019	620	215	-	-	88	0.679	-	0.35	0.3	143.0	-	<0.01	0.22	0.22	121	-	<1	<1	1950	1950	<10	-	-	-	-	-	-	-	6.7	4780	22.1	3.8	-	
	BH-12r	17/12/2019	260	292	-	-	48	0.525	-	0.06	0.3	0.2	-	0.42	68.40	68.80	17	-	<1	<1	617	617	256	-	-	-	-	-	-	6.6	2550	22.4	4.59	-		
	BH-13	17/12/2019	104	197	-	-	61	0.208	-	0.13	0.4	1.2	-	0.08	7.28	7.36	27	-	<1	<1	612	612	311	-	-	-	-	-	-	6.9	1840	25.8	4.57	-		
	BH-14	17/12/2019	243	186	-	-	21	0.247	-	0.50	0.8	2.9	-	0.02	1.60	1.62	32	-	<1	<1	704	704	108	-	-	-	-	-	-	6.8	1970	21.5	5.07	-		
	BH-15	17/12/2019	2740	214	-	-	694	0.444	-	12.80	0.4	111.0	-	0.03	0.29	0.32	170	-	<1	<1	938	938	440	-	-	-	-	-	-	6.7	10400	20.9	0.95	-		
	BH-19r	17/12/2019	270	159	-	-	21	0.118	-	0.17	0.2	5.4	-	0.09	0.05	0.14	32	-	<1	<1	501	501	201	-	-	-	-	-	-	7.1	1940	19	4.69	-		
Surface Water	SWP-1	17/12/2019	53	31	12	48	7	-	3.03	0.72	-	-	-	-	-	-	-	-	<1	<1	148	148	<5	-	-	44	26	4	5	4	7.1	-	-	-	-	
	SWP-2	17/12/2019	399	95	56	341	30	-	0.07	<0.05	-	-	-	-	-	-	-	-	<1	<1	536	536	207	-	-	9	4	26	25	3	7.8	-	-	-	-	
	SWP-4	17/12/2019	447	53	68	380	20	-	0.20	<0.05	-	-	-	-	-	46	3	<1	<1	34	350	383	316	-	-	30	9	27	25	3	8.7	-	-	-	-	
	SWP-5	17/12/2019	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	SWC-up	17/12/2019	18300	463	1340	11000	401	-	<0.50	0.10	-	-	0.50	<0.01	<0.01	<0.01	-	-	<1	<1	207	207	2880	-	-	<5	1	580	622	3	7.2	-	-	-	-	-
SWC-2	17/12/2019	-	-	-	-	-	-	<0.50	<0.10	-	-	0.48	<0.01	<0.01	<0.01	-	-	<1	<1	202	202	-	-	-	<5	-	-	-	-	7.1	-	-	-	-		
SWC-down	17/12/2019	18100	452	1330	11000	396	-	<0.50	<0.10	-	-	0.28	<0.01	<0.01	<0.01	-	-	<1	<1	202	202	2850	-	-	5	1	574	621	4	7.4	-	-	-	-	-	
SWC-down 2	17/12/2019	18400	461	1420	11800	415	-	1.48	<0.10	-	-	0.03	<0.01	0.05	0.05	-	-	<1	<1	186	186	2940	-	-	56	18	584	664	6	7.6	-	-	-	-		
Leachate Sump	17/12/2019	2050	105	-	-	502	0.412	3.22	-	0.8	1400	-	0.68	0.01	0.69	900	-	<1	<1	6000	6000	<5	2	24	-	-	-	-	-	7.8	16600	32.1	-	-		
Leachate Tank LP1	17/12/2019	1990	122	-	-	560	0.425	3.52	-	0.9	1450	-	<0.10	<0.10	<0.10	870	-	<1	<1	5950	5950	<5	4	57	-	-	-	-	-	7.8	16200	28.3	-	-		

^A Investigation levels apply to typical slightly/moderately disturbed systems. Trigger Levels for 95% of species. See ANZECC & ARMCANZ (2000) for guidance on applying these levels to different ecosystem conditions. Also the same as the NEPM (2013) EILs.

^B ANZG 2018 - pH Upper and Lower Limit for NSW Lowland Rivers (Table 3.3.2).

^C Investigation levels are taken from the health values of the Australian Drinking Water Guidelines (NHMRC 2016).

TABLE 8: Total Concentration Results
 EPL Quarterly Water Monitoring Results - March 2020: Dunmore Recycling and Waste Depot

GILs - Trigger Values for Freshwater (Protection of 95% of Species) ^a		-	-	-	-	-	1.9	-	-	-	0.9 (pH 8)	0.9 (pH 8)	-	0.7	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.5 - 8.0	2200	-			
GILs - Trigger Values for Marine Water (Protection of 95% of Species) ^a		-	-	-	-	-	-	-	-	-	0.91 (pH 8)	0.91 (pH 8)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Australian Drinking Water Guidelines (2016) ^f	Health	-	-	-	-	-	0.5	-	-	1.5	-	-	3	50	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.5 - 8.0	-	-			
	Aesthetic	250	-	-	-	180	-	0.1	0.3	0.3	-	0.5	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.5 - 8.0	-	-			
Sample No.	Date Sampled	Chloride	Calcium	Magnesium	Sodium	Potassium	Manganese	Total Iron	Dissolved Iron	Fluoride	Ammonia as N	Ammonium as N	Nitrite as N	Nitrate as N	Nitrite + Nitrate as N	Total Organic Carbon	Biochemical Oxygen Demand	Hydroxide Alkalinity as CaCO3	Carbonate Alkalinity as CaCO3	Bicarbonate Alkalinity as CaCO3	Total Alkalinity as CaCO3	Sulfate as SO4 - Turbidimetric	Dissolved Oxygen	Dissolved Oxygen - % Saturation	Suspended Solids (SS)	Turbidity	Total Anions	Total Cations	Ionic Balance	pH	Electrical Conductivity	Temperature	Depth to Water (m)g TOC	Comments					
Units		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	mg/L	NTU	meq/L	meq/L	meq/L	meq/L	meq/L	meq/L	pH	µS/cm	°C	mbgl				
Laboratory PQL		1	1	1	1	1	0.001	0.05	0.05	0.1	0.01	0.01	0.01	0.01	0.01	1	2	1	1	1	1	1	0.01	0.1	5	0.1	0.01	0.01	0.01	0.01	0.01	1	0.1	0.1	-	-			
Groundwater Bores	BH-1c	11/03/2020	934	-	-	-	-	0.107	-	0.11	0.2	377.0	-	0.08	0.26	0.34	167	-	<1	<1	2360	2360	<10	-	-	-	-	-	-	-	-	-	-	-	-	-			
	BH-3	11/03/2020	328	-	-	-	-	0.050	-	0.05	0.1	32.5	-	0.05	5.77	5.82	11	-	<1	<1	460	460	86	-	-	-	-	-	-	-	-	-	-	-	-	-			
	BH-4	11/03/2020	112	-	-	-	-	0.102	-	0.10	<0.1	1.8	-	0.02	0.64	0.66	13	-	<1	<1	294	294	99	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	BH-9	11/03/2020	560	-	-	-	-	0.835	-	1.91	0.3	137.0	-	0.17	0.06	0.23	80	-	<1	<1	1970	1970	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	BH-12r	11/03/2020	226	-	-	-	-	0.753	-	<0.05	0.2	0.1	-	0.30	33.70	34.00	10	-	<1	<1	597	597	223	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	BH-13	11/03/2020	48	-	-	-	-	0.087	-	0.09	0.2	0.2	-	0.06	16.00	16.10	16	-	<1	<1	434	434	125	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH-14	11/03/2020	115	-	-	-	-	0.310	-	0.31	0.3	0.04	-	0.30	202.00	202.00	49	-	<1	<1	125	125	136	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH-15	11/03/2020	3260	-	-	-	-	0.754	-	0.75	0.2	69.6	-	0.03	0.09	0.12	145	-	<1	<1	639	639	586	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	BH-19r	11/03/2020	315	-	-	-	-	0.110	-	0.63	0.1	5.5	-	0.16	0.41	0.57	26	-	<1	<1	517	517	230	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Surface Water	SWP-1	11/03/2020	52	23	8	31	12	-	2.05	0.90	-	-	-	-	-	-	-	-	<1	<1	103	103	8	-	-	36	9	4	3	3	6.8	-	-	-	-	-			
	SWP-2	11/03/2020	315	72	40	230	24	-	0.10	<0.05	-	-	-	-	-	-	-	-	<1	14	407	421	181	-	-	6	3	21	18	9	7.6	-	-	-	-	-			
	SWP-4	11/03/2020	422	32	55	329	18	-	0.08	<0.05	-	-	-	-	-	-	29	4	<1	49	272	321	300	-	-	25	13	25	21	8	9	-	-	-	-	-	-	Sand Mine Dam	
	SWP-5	11/03/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry	
	SWC-up	11/03/2020	9520	239	631	5280	194	-	0.48	0.07	-	-	0.04	<0.01	0.01	0.01	-	-	<1	<1	128	128	1450	-	-	<5	5	301	298	0	7.6	-	-	23	-	-	-		
Rocklow Creek	SWC-2	11/03/2020	-	-	-	-	-	0.70	0.05	-	-	0.06	<0.01	0.02	0.02	-	-	<1	<1	146	146	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-		
	SWC-down	11/03/2020	10400	256	697	5760	212	-	0.39	0.06	-	-	0.06	<0.01	0.06	0.06	-	-	<1	<1	123	123	1570	-	-	8	5	328	326	0	7.6	-	-	22	-	-	-		
	SWC-down 2	11/03/2020	11900	318	832	6950	247	-	10.50	<0.10	-	-	0.08	<0.01	0.01	0.01	-	-	<1	<1	122	122	1830	-	-	160	52	376	393	2	7.6	-	-	22	-	-	-		
Leachate	Leachate Sump	11/03/2020	1480	21	-	-	36	0.616	2.74	-	0.4	1000	-	<0.10	0.12	0.12	352	-	<1	<1	3720	2720	204	0.17	1.9	-	-	-	-	-	-	-	-	-	-	-	-		
	Leachate Tank LP1	11/03/2020	1450	161	-	-	221	0.657	3.26	-	0.3	638	-	<0.10	0.86	0.86	315	-	<1	<1	2710	2710	205	3	32	-	-	-	-	-	-	-	-	-	-	-	-		

^a Investigation levels apply to typical slightly-moderately disturbed systems. Trigger Levels for 95% of species. See ANZECC & ARMCANZ (2000) for guidance on applying these levels to different ecosystem conditions. Also the same as the NEPM (2013) EILs.
^b ANZG 2018 - pH Upper and Lower Limit for NSW Lowland Rivers (Table 3.3.2).
^c Investigation levels are taken from the health values of the Australian Drinking Water Guidelines (NHMRC 2016).

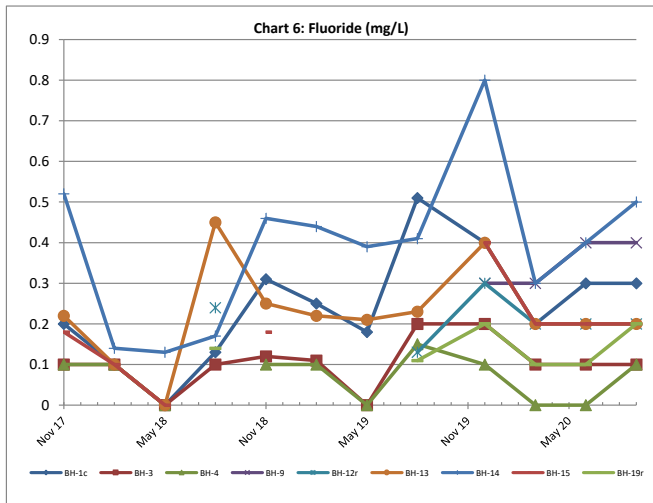
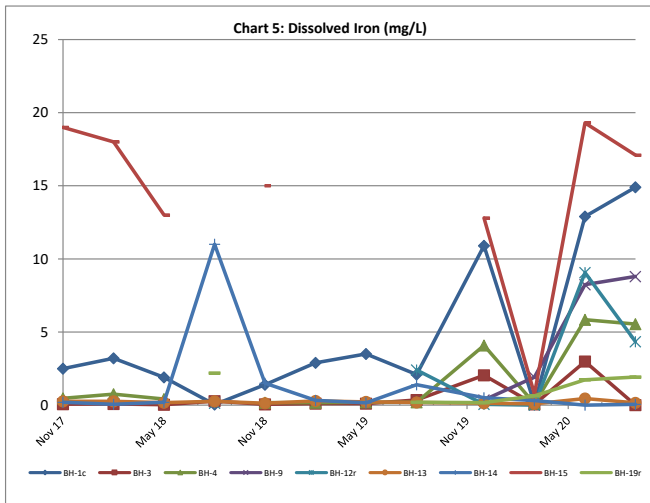
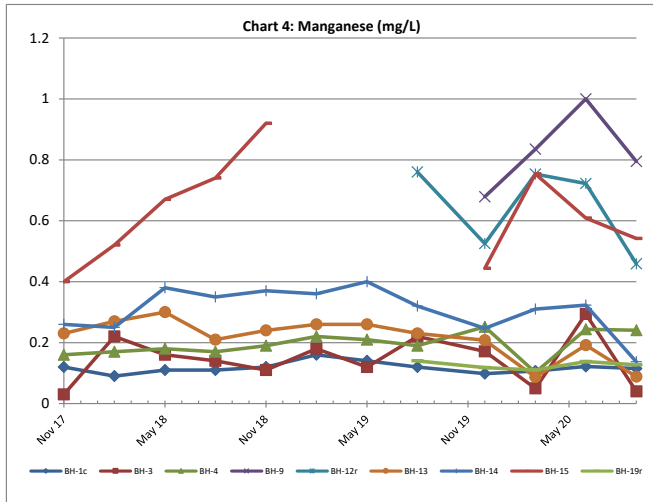
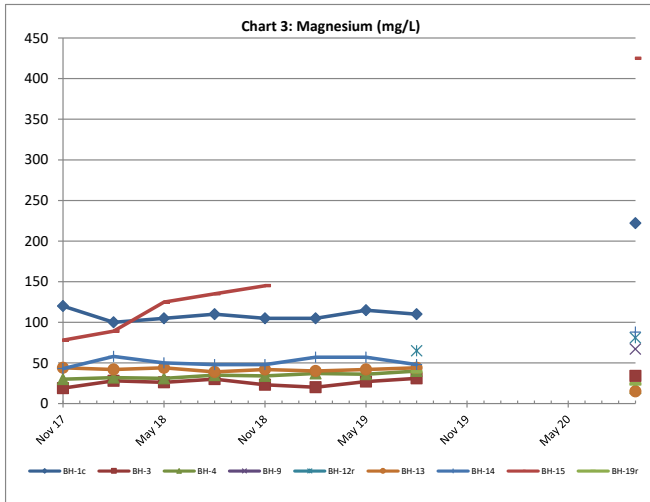
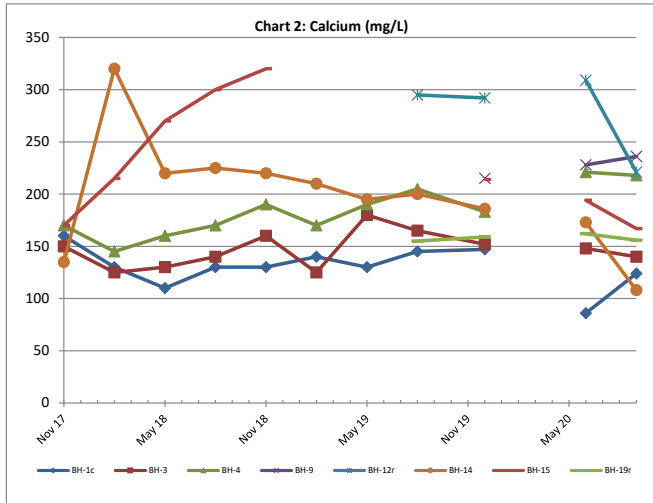
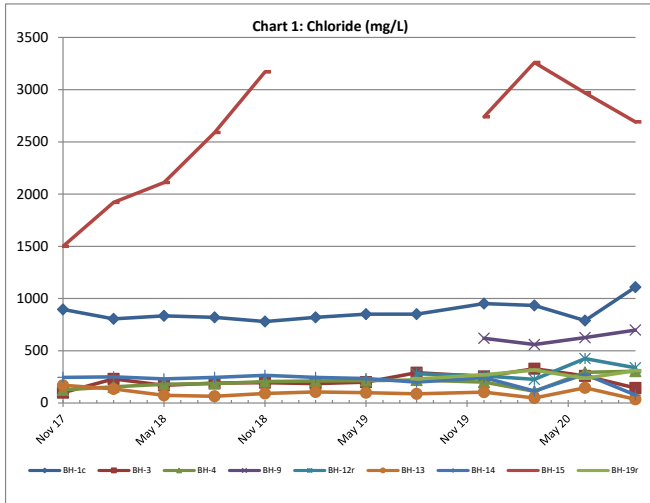
TABLE 9: Total Concentration Results
EPL Quarterly Water Monitoring Results - June 2020: Dunmore Recycling and Waste Depot

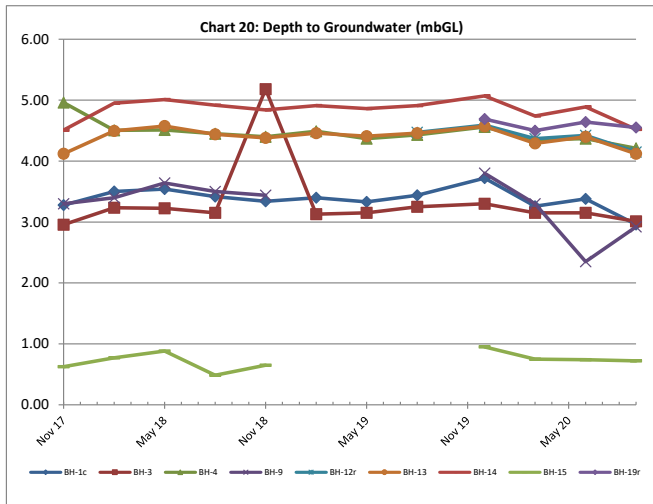
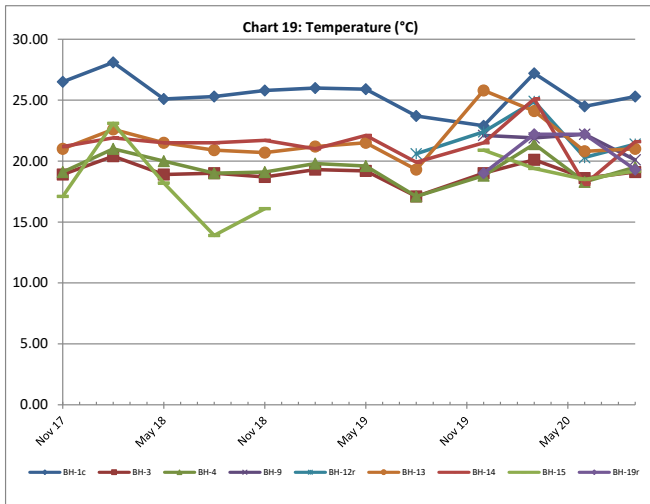
GILs - Trigger Values for Freshwater (Protection of 95% of Species) ^A		-	-	-	-	-	1.9	-	-	-	0.9 (pH 8)	0.9 (pH 8)	-	0.7	0.7	-	-	-	-	-	-	85 - 110	-	6 - 50	-	-	-	6.5 - 8.0	2200	-						
GILs - Trigger Values for Marine Water (Protection of 95% of Species) ^A		-	-	-	-	-	-	-	-	-	0.91 (pH 8)	0.91 (pH 8)	-	-	-	-	-	-	-	-	-	90 - 110	-	0.5 - 10	-	-	-	-	-	-						
Australian Drinking Water Guidelines (2016) ^F	Health	-	-	-	-	-	0.5	-	-	1.5	-	-	3	50	3	-	-	-	-	-	-	-	-	-	-	-	-	6.5 - 8.0	-	-						
	Aesthetic	250	-	-	180	-	0.1	0.3	0.3	-	0.5	0.5	-	-	-	-	-	-	-	-	-	250	-	-	5	-	-	-	6.5 - 8.0	-	-					
Sample No.	Date Sampled	Chloride	Calcium	Magnesium	Sodium	Potassium	Manganese	Total Iron	Dissolved Iron	Fluoride	Ammonia as N	Ammonium as N	Nitrite as N	Nitrate as N	Nitrite + Nitrate as N	Total Organic Carbon	Biochemical Oxygen Demand	Hydroxide Alkalinity as CaCO3	Carbonate Alkalinity as CaCO3	Bicarbonate Alkalinity as CaCO3	Total Alkalinity as CaCO3	Sulfate as SO4 - Turbidimetric	Dissolved Oxygen	Dissolved Oxygen - % Saturation	Suspended Solids (SS)	Turbidity	Total Anions	Total Cations	Ionic Balance	pH	Electrical Conductivity	Temperature	Depth to Water (m) (mg TOC)	Comments		
Units		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	mg/L	NTU	meq/L	meq/L	meq/L	meq/L	meq/L	pH	µS/cm	°C	mbgl		
Laboratory PQL		1	1	1	1	1	0.001	0.05	0.05	0.1	0.01	0.01	0.01	0.01	0.01	1	2	1	1	1	1	1	0.01	0.1	5	0.1	0.01	0.01	0.01	1	0.1	0.1	-	-		
Groundwater Bores	BH-1c	17/06/2020	790	86	-	-	145	0.122	-	12.90	0.3	131.0	-	<0.10	<0.10	<0.10	179	-	<1	<1	2650	2650	<10	-	-	-	-	-	-	-	-	6.8	6740	24.5	3.38	-
	BH-3	17/06/2020	259	148	-	-	32	0.294	-	2.98	0.1	20.4	-	0.02	16.90	16.90	15	-	<1	<1	414	414	95	-	-	-	-	-	-	-	7.5	1780	18.6	3.15	-	
	BH-4	17/06/2020	293	221	-	-	20	0.244	-	5.84	<0.1	6.11	-	<0.01	<0.01	<0.01	21	-	<1	<1	640	640	149	-	-	-	-	-	-	-	7.2	2230	18.3	4.37	-	
	BH-9	17/06/2020	627	228	-	-	82	1.000	-	8.24	0.4	48.6	-	0.01	<0.01	0.01	81	-	<1	<1	1530	1530	<1	-	-	-	-	-	-	-	6.9	4720	22.2	2.35	-	
	BH-12r	17/06/2020	425	309	-	-	66	0.722	-	9.06	0.2	0.92	-	0.05	1.76	1.81	15	-	<1	<1	605	605	420	-	-	-	-	-	-	-	6.8	2790	20.3	4.42	-	
	BH-13	17/06/2020	146	167	-	-	30	0.192	-	0.45	0.2	1.13	-	0.02	0.97	0.99	23	-	<1	<1	588	588	159	-	-	-	-	-	-	7.2	1690	20.8	4.4	-		
	BH-14	17/06/2020	275	173	-	-	47	0.323	-	<0.05	0.4	0.42	-	0.05	61.40	61.40	37	-	<1	<1	504	504	122	-	-	-	-	-	-	-	6.6	2350	18.1	4.89	-	
	BH-15	17/06/2020	2970	194	-	-	632	0.609	-	19.30	0.2	60.8	-	<0.10	<0.10	<0.10	148	-	<1	<1	690	690	570	-	-	-	-	-	-	-	6.8	9240	18.5	0.74	-	
	BH-19r	17/06/2020	236	162	-	-	22	0.138	-	1.73	0.1	4.23	-	0.01	0.07	0.08	18	-	<1	<1	475	475	207	-	-	-	-	-	-	7.3	1760	22.2	4.64	-		
Surface Water	SWP-1	17/06/2020	68	30	12	38	19	-	2.13	1.31	-	-	-	-	-	-	-	-	-	-	133	133	<1	-	-	20	3	5	5	1	7	-	-	-	-	
	SWP-2	17/06/2020	351	87	45	267	24	-	0.08	<0.05	-	-	-	-	-	-	-	-	<1	14	430	430	180	-	-	7	2	22	20	5	7.9	-	-	-	-	
	SWP-4	17/06/2020	441	58	64	365	18	-	0.17	<0.05	-	-	-	-	-	-	26	2	<1	49	402	402	260	-	-	14	5	26	25	3	8.1	-	-	-	-	Sand Mine Dam
	SWP-5	17/06/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
	SWC-up	17/06/2020	14100	337	998	8190	287	-	0.19	<0.10	-	-	0.34	<0.01	0.06	0.06	-	-	-	-	-	167	167	2130	-	-	18	2	445	462	2	7	-	-	-	-
Rocklow Creek	SWC-2	17/06/2020	-	-	-	-	-	0.24	<0.10	-	-	1.68	<0.01	0.05	0.05	-	-	-	-	-	170	170	-	-	-	11	-	-	-	-	7.2	-	-	-	-	
	SWC-down	17/06/2020	14900	356	1060	8890	313	-	<0.10	<0.10	-	-	0.72	<0.01	0.03	0.03	-	-	-	-	162	162	2280	-	-	6	2	471	500	3	7.4	-	-	-	-	
	SWC-down 2	17/06/2020	14200	337	978	8180	287	-	0.13	<0.10	-	-	0.28	<0.01	0.04	0.04	-	-	-	-	169	169	2100	-	-	10	1	448	460	1	7.3	-	-	-	-	
Leachate	Leachate Sump	17/06/2020	1640	7	-	-	12	0.672	1.96	-	0.4	611	-	<0.20	<1.00	<1.00	238	-	<1	<1	3620	3620	104	0.35	3.5	-	-	-	-	-	7.7	12000	15.3	-	-	
	Leachate Tank LP1	17/06/2020	2040	230	-	-	190	0.605	0.69	-	0.2	60	-	<0.20	<0.20	<0.20	309	-	<1	<1	3010	3010	<20	7	73	-	-	-	-	7.6	11000	14.1	-	-		

^A Investigation levels apply to typical slightly-moderately disturbed systems. Trigger Levels for 95% of species. See ANZECC & ARMCANZ (2000) for guidance on applying these levels to different ecosystem conditions. Also the same as the NEPM (2013) EILs.
^B ANZG 2018 - pH Upper and Lower Limit for NSW Lowland Rivers (Table 3.3.2).
^F Investigation levels are taken from the health values of the Australian Drinking Water Guidelines (NHMRC 2016).

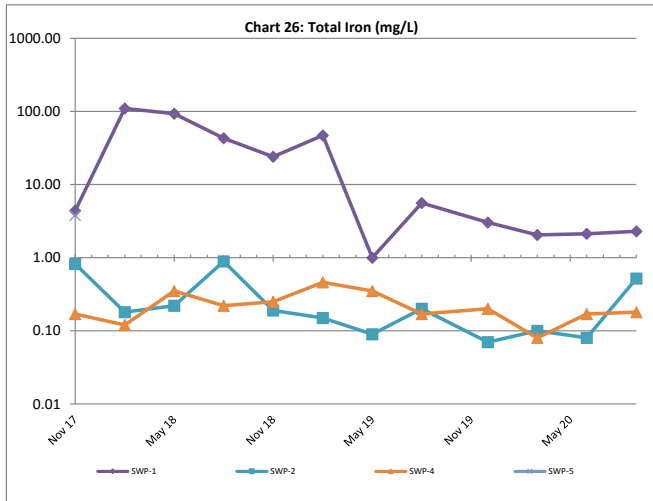
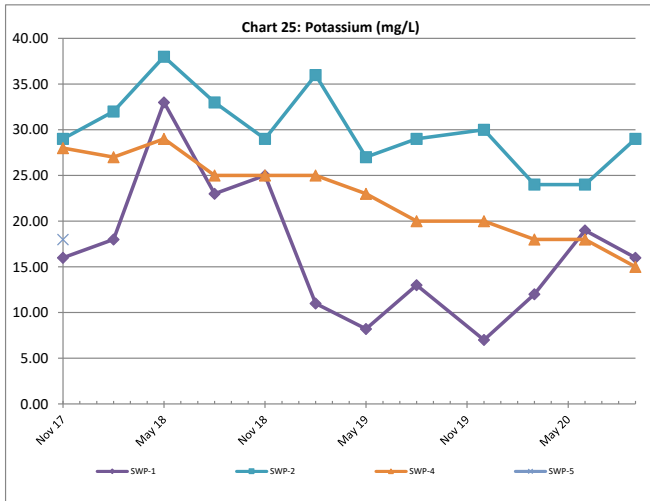
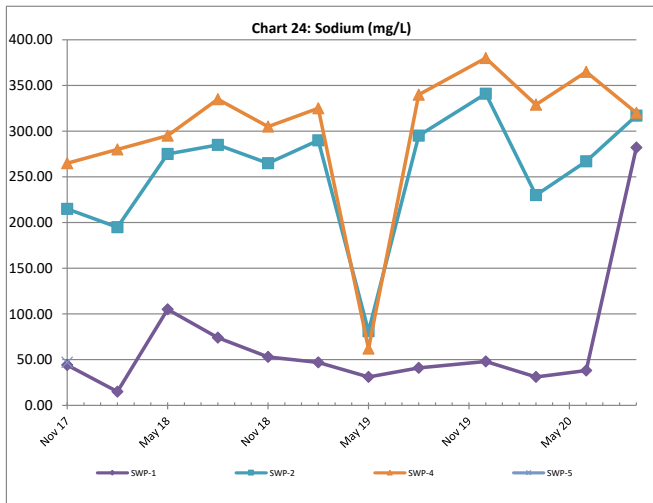
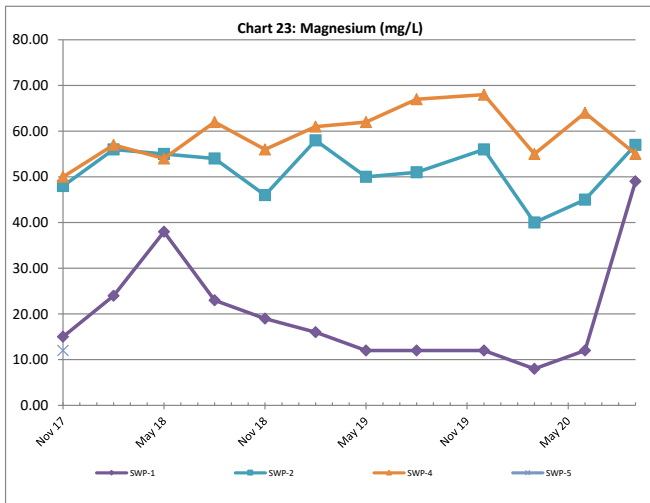
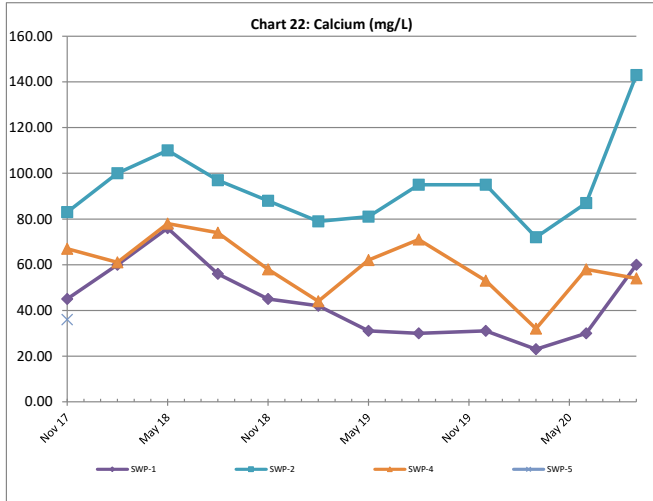
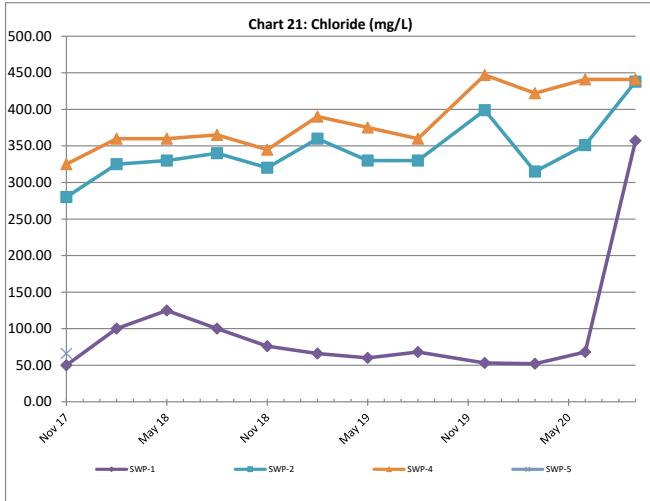
CHARTS

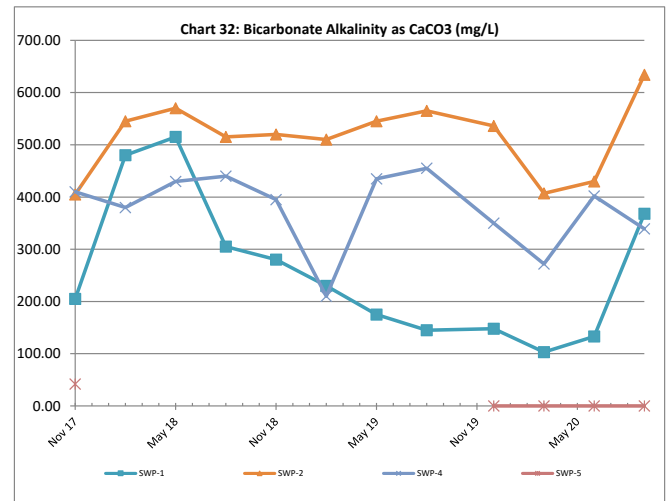
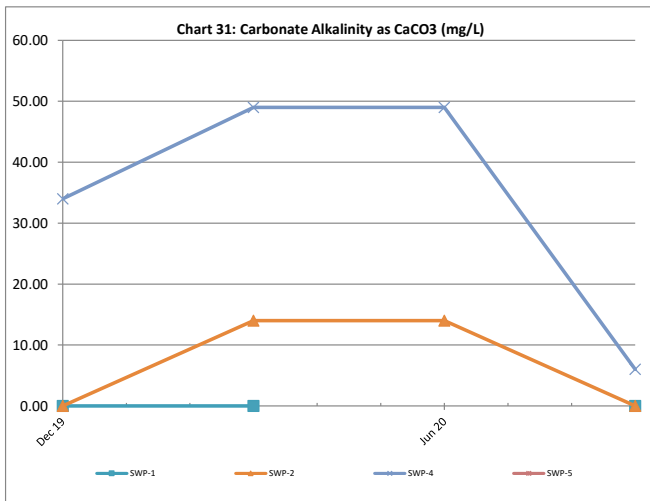
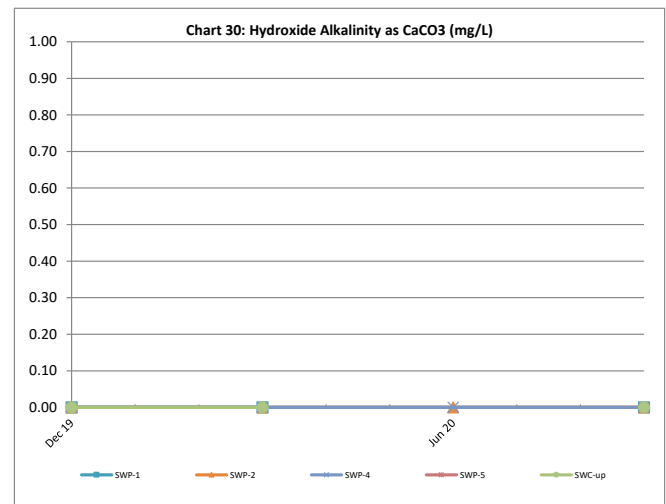
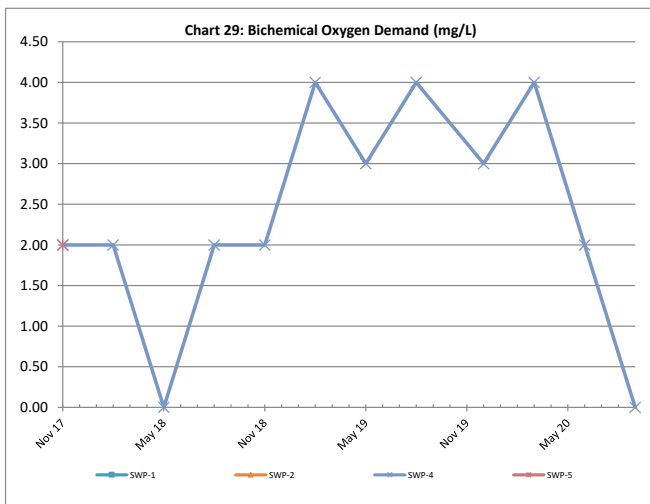
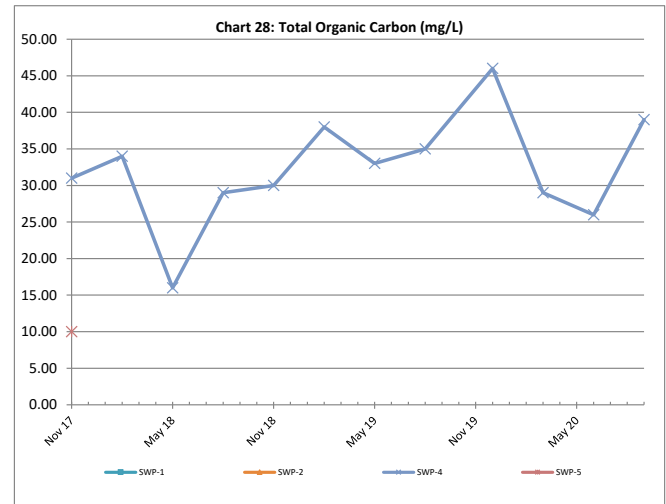
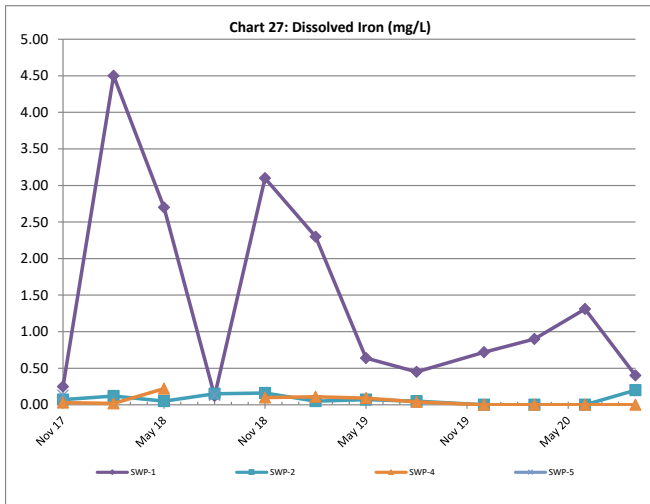
Charts 1-20: Groundwater Results

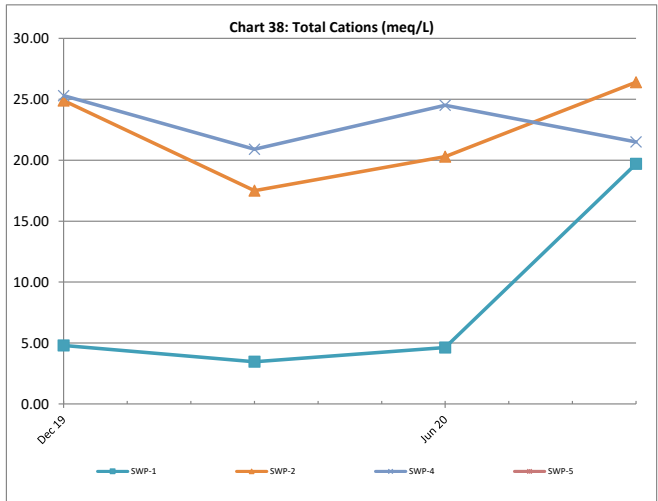
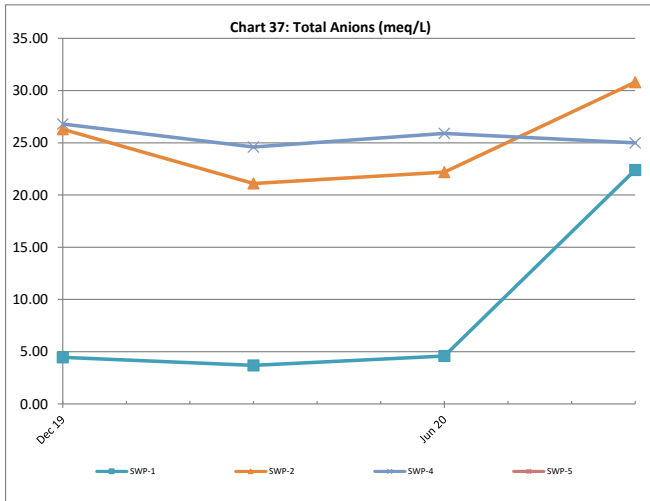
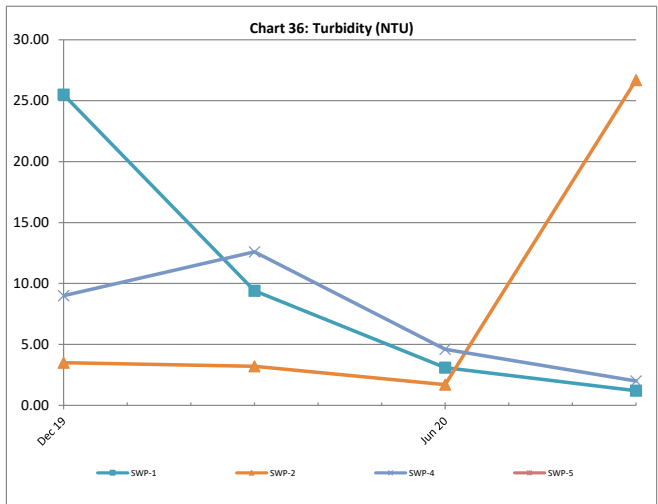
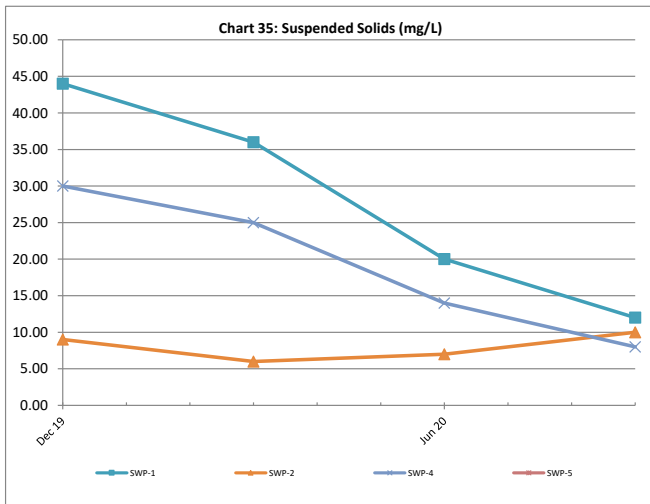
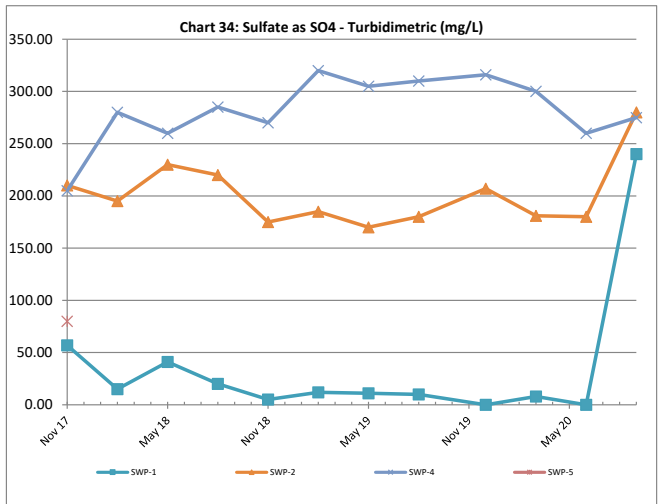
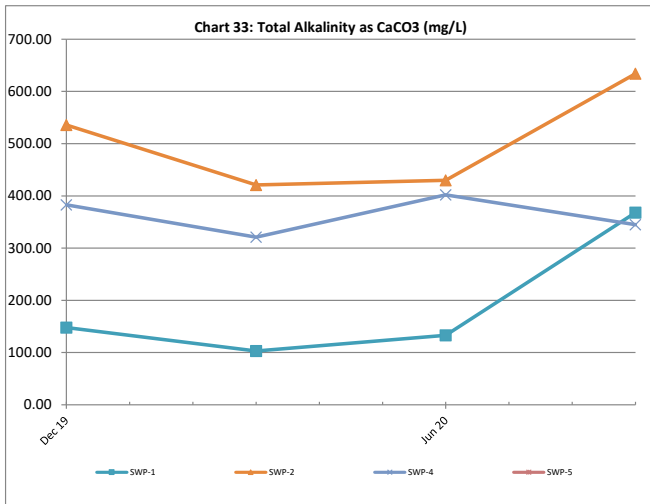




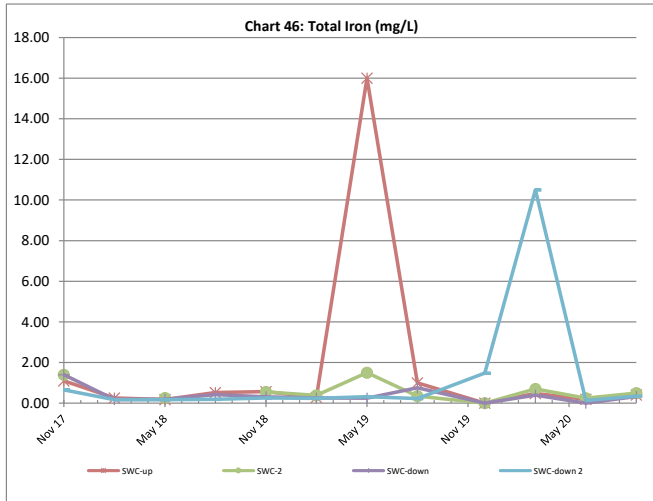
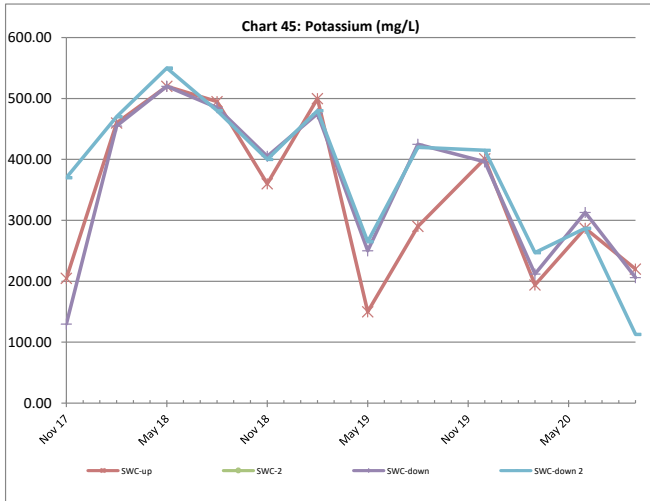
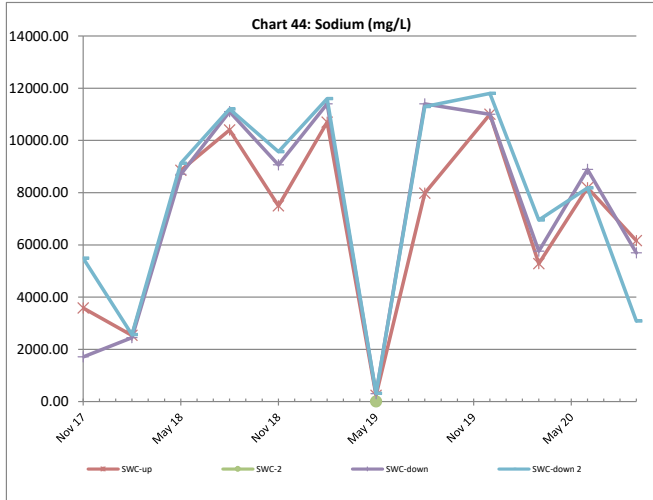
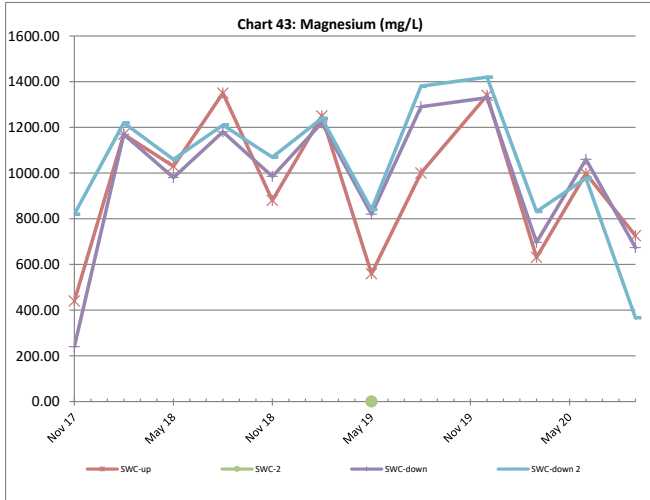
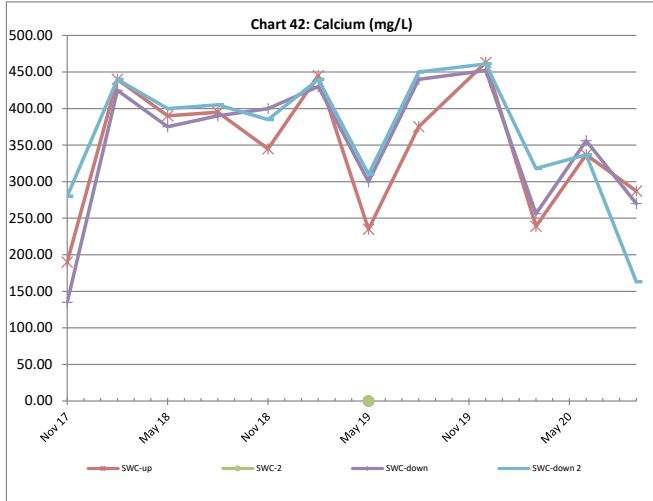
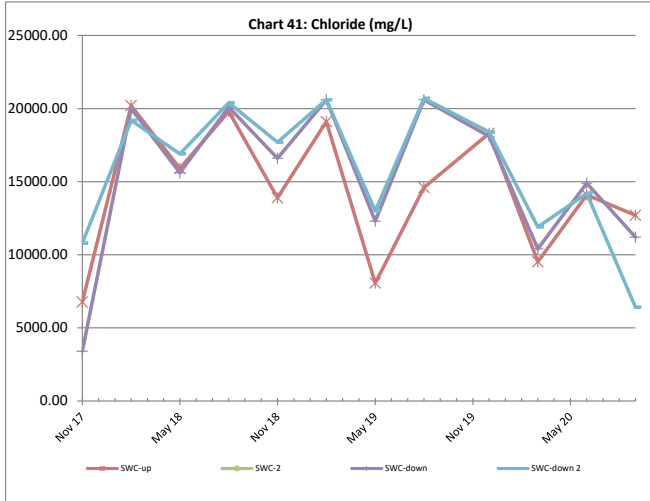
Charts 21-40: Onsite Surface Water Results

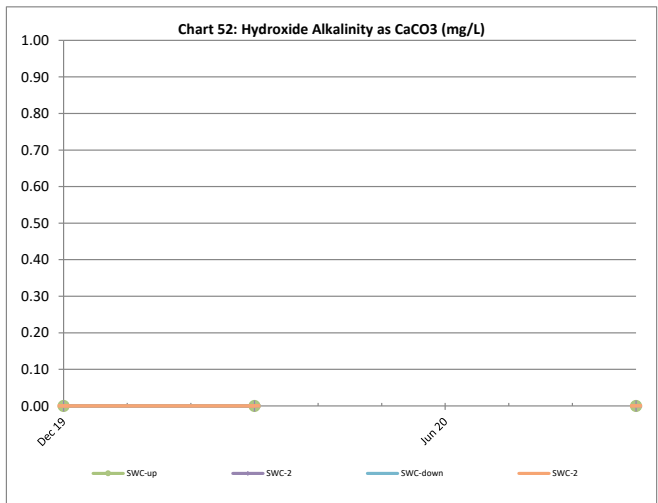
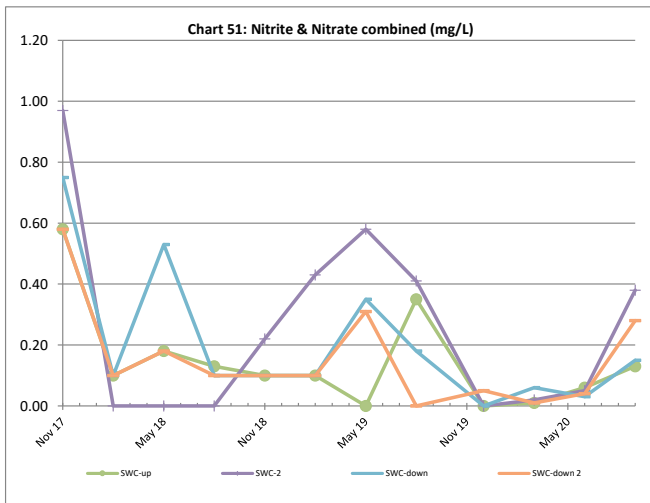
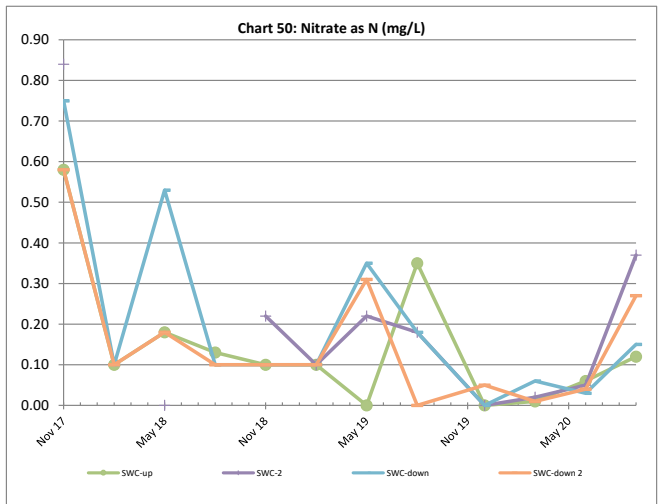
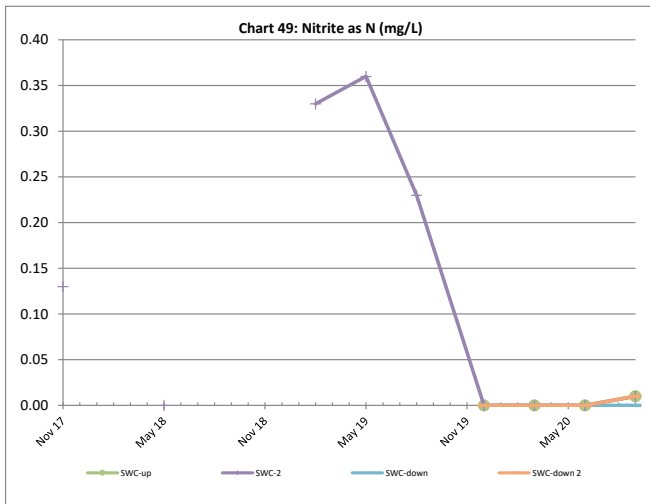
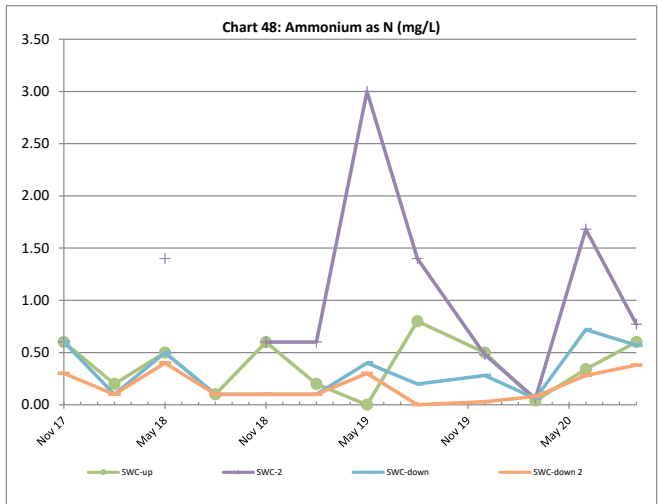
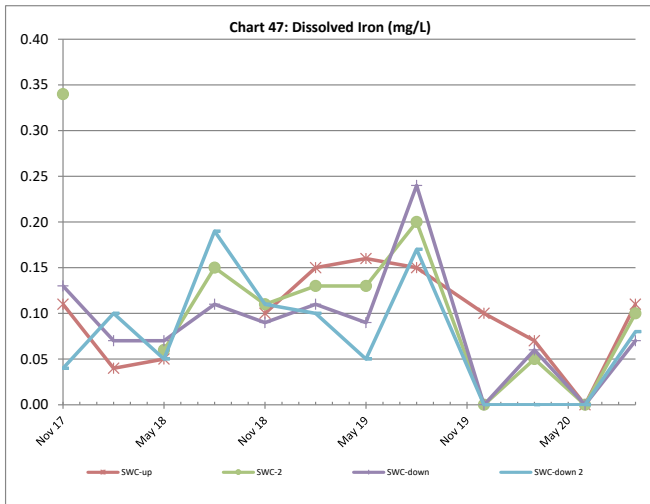


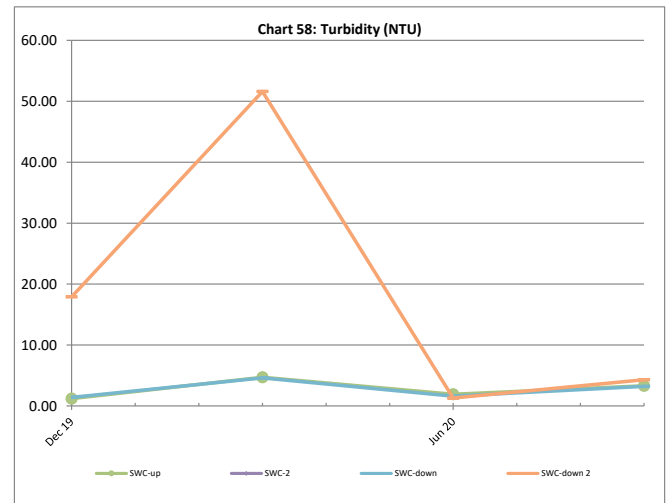
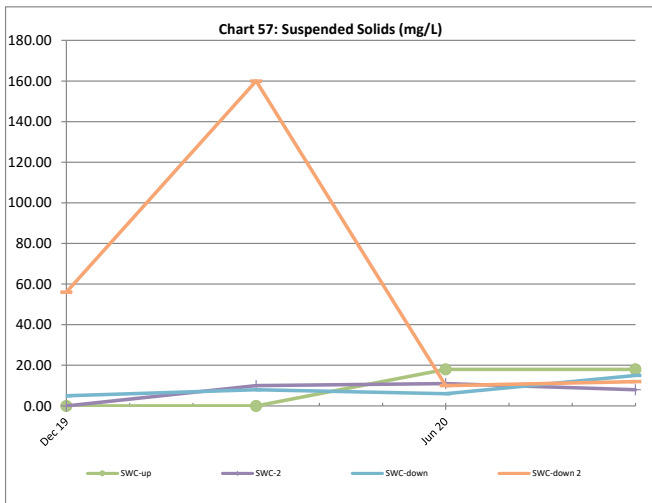
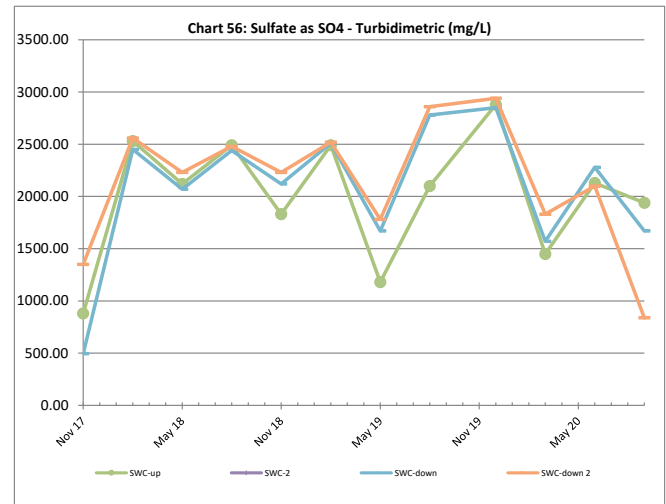
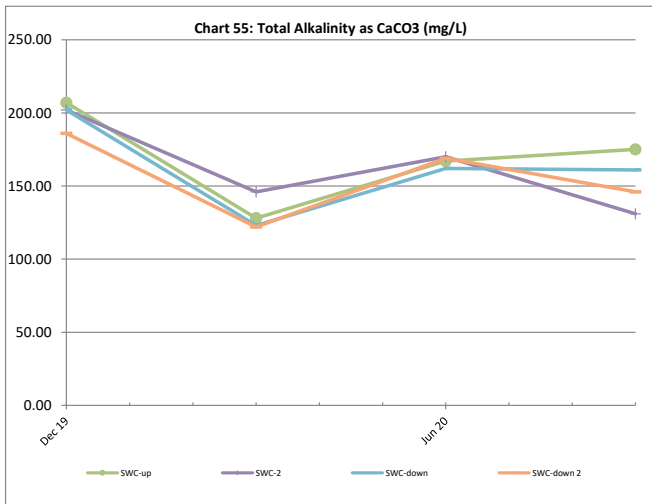
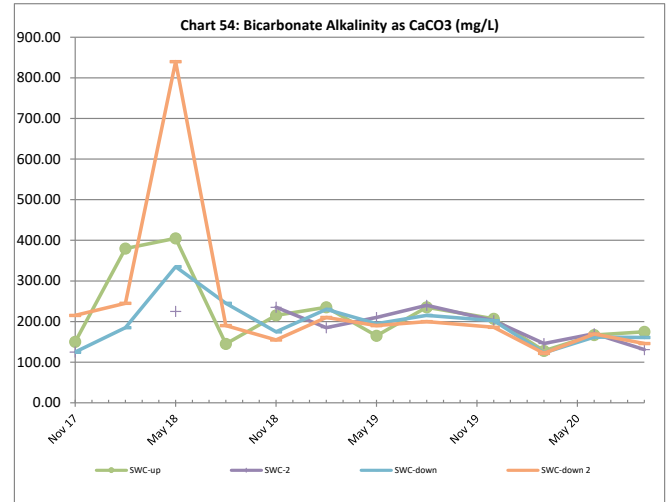
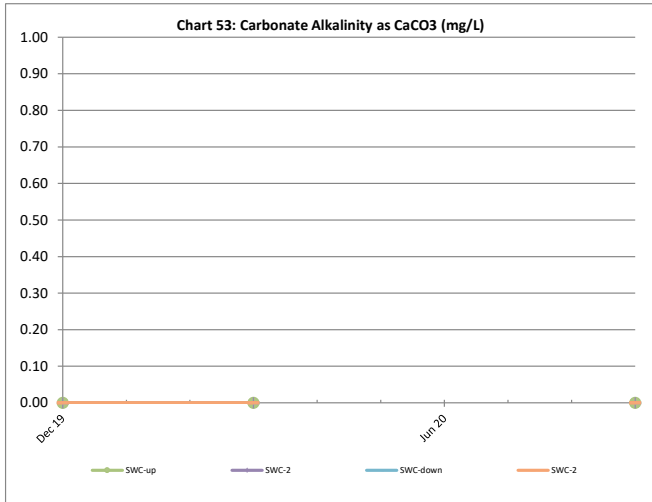


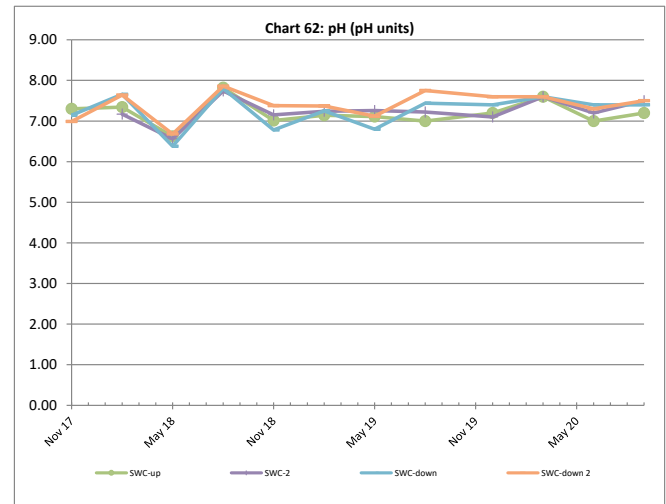
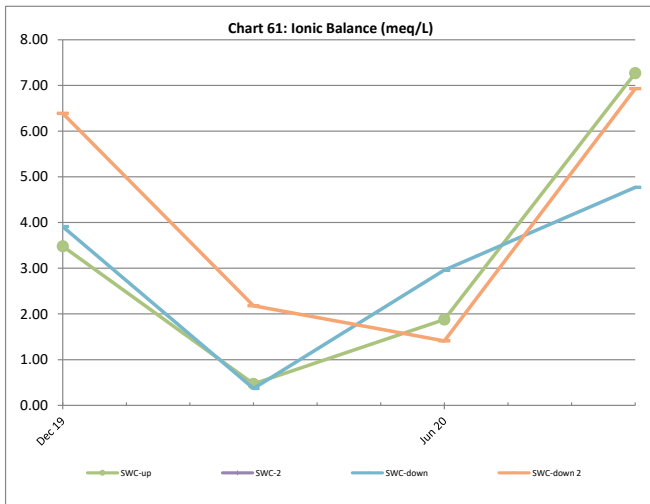
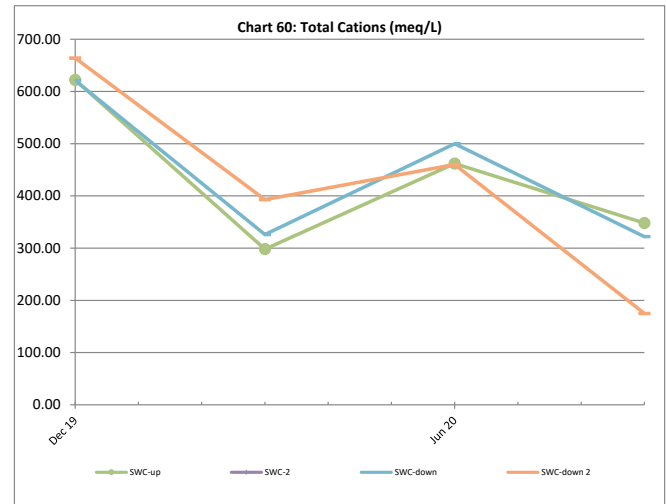
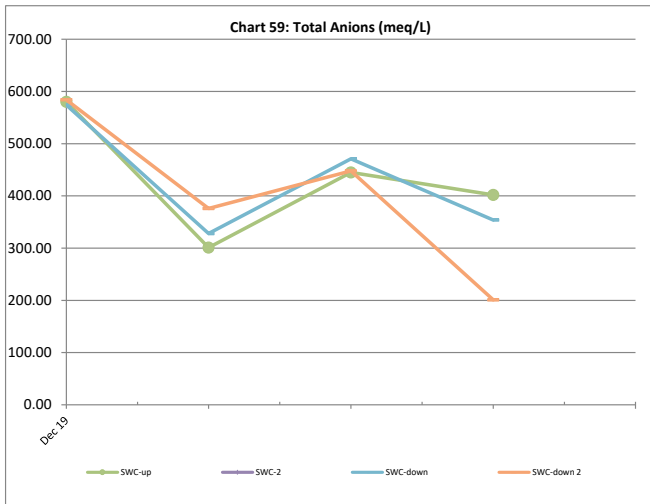


Charts 41-62: Rocklow Creek Results

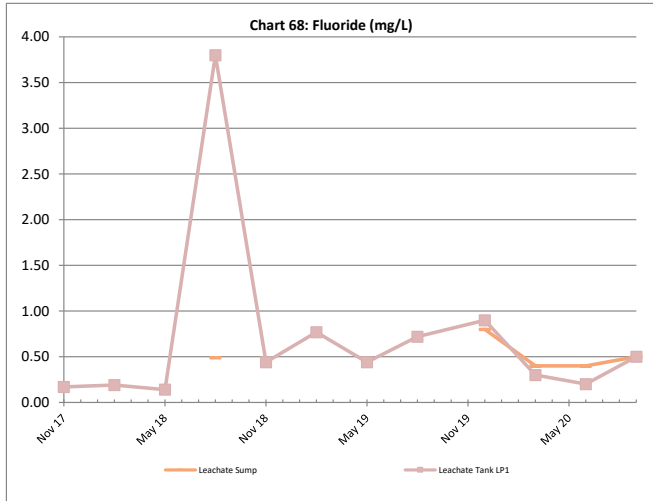
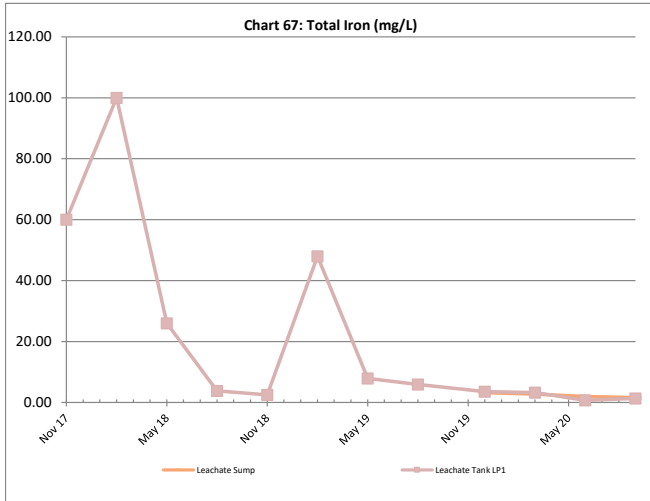
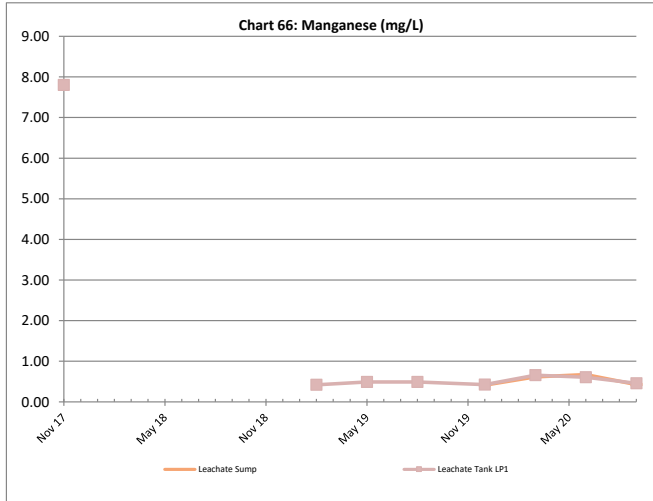
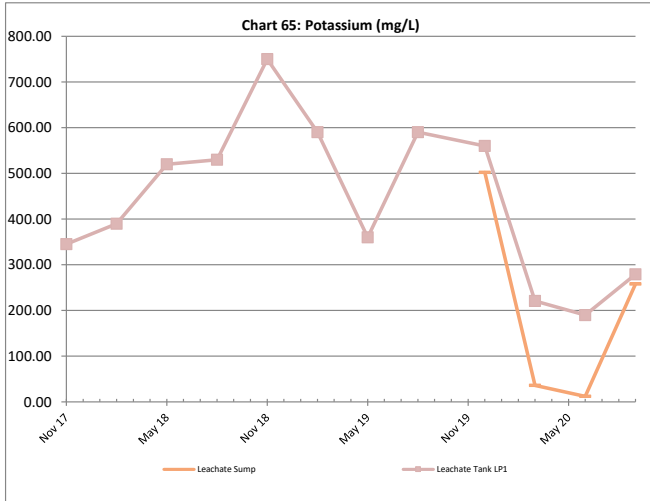
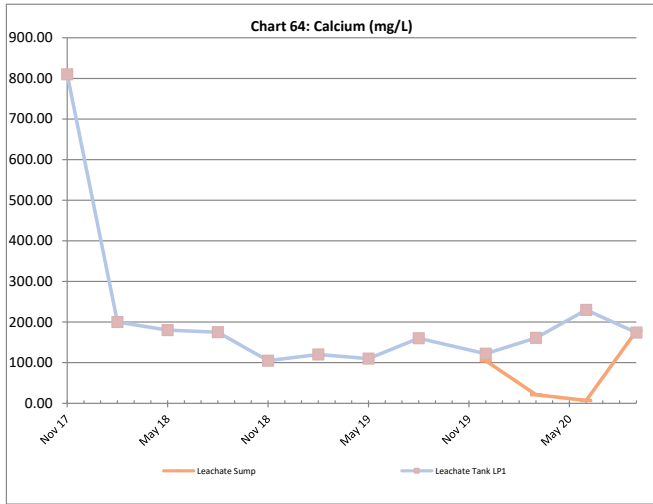
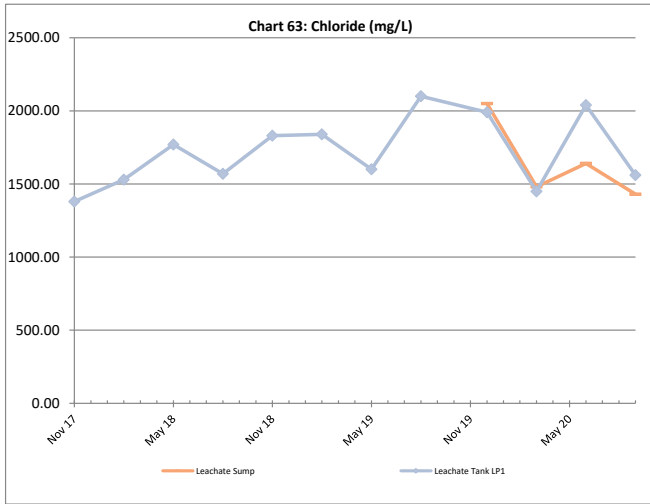


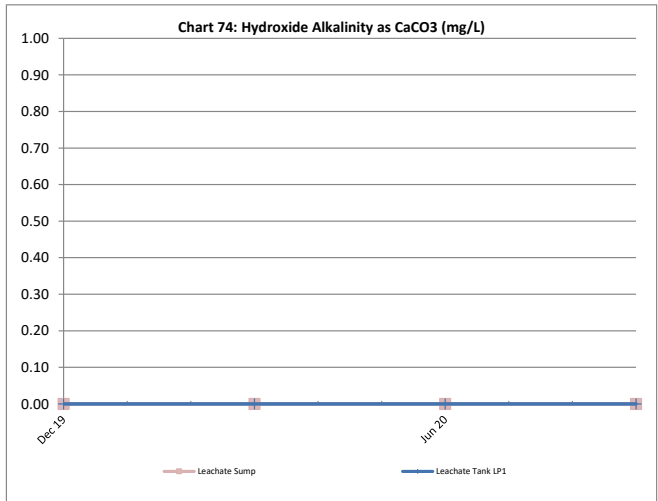
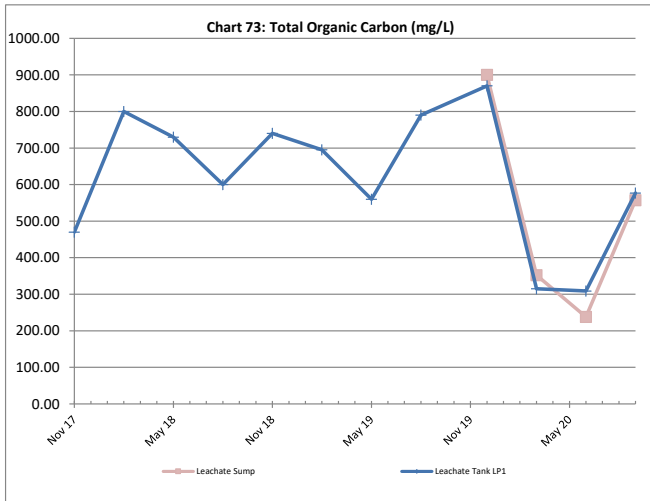
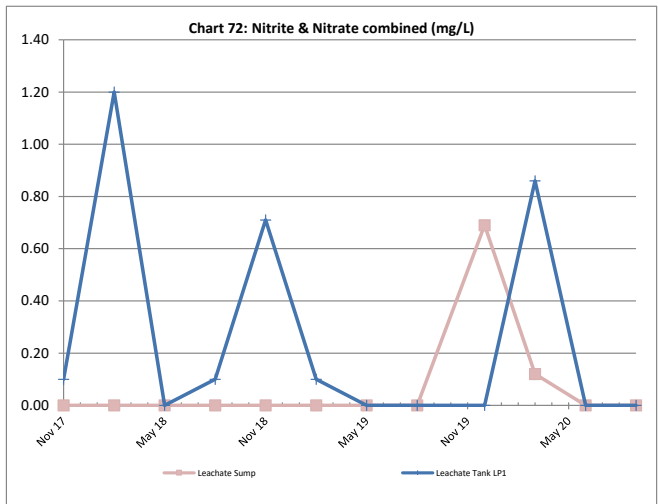
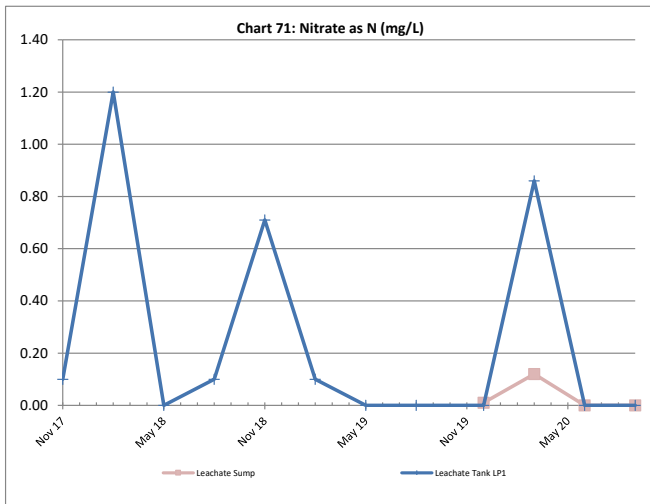
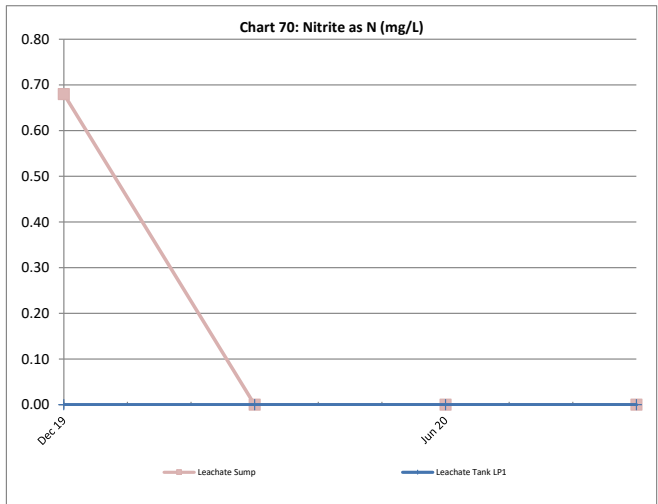
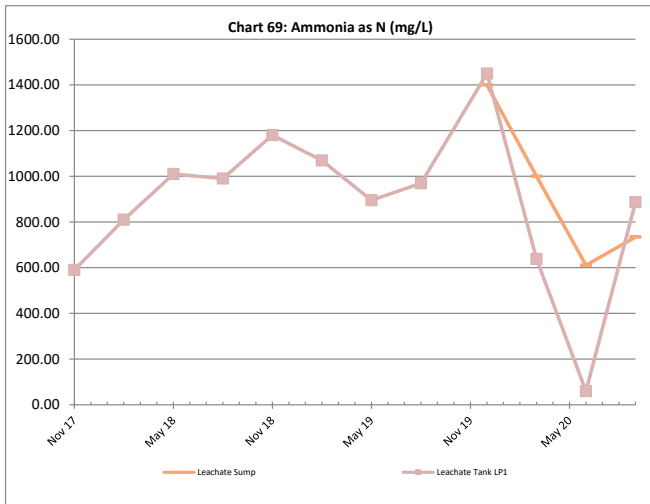


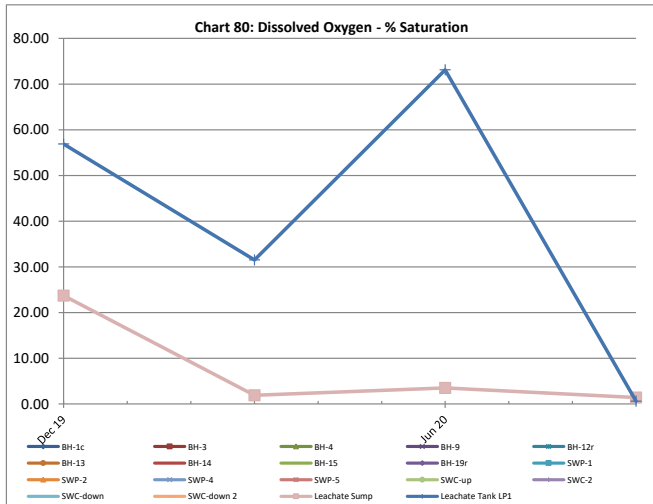
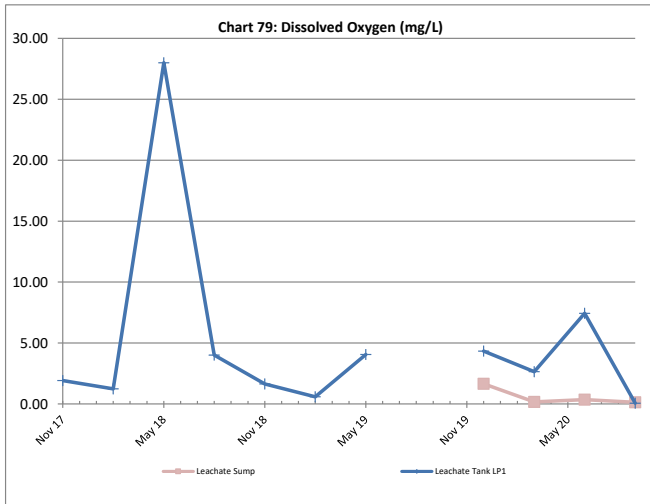
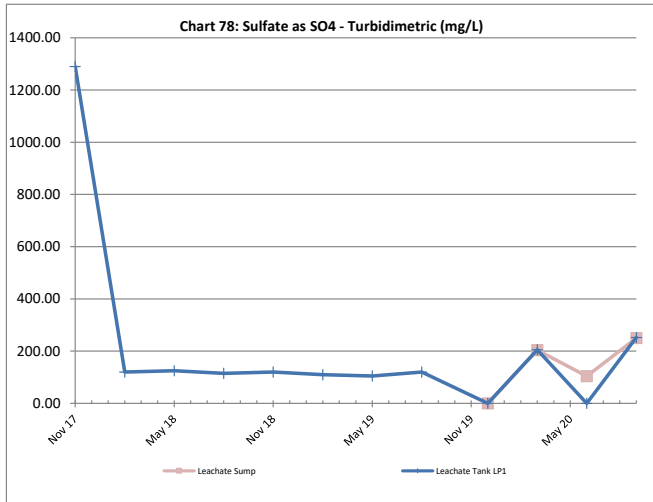
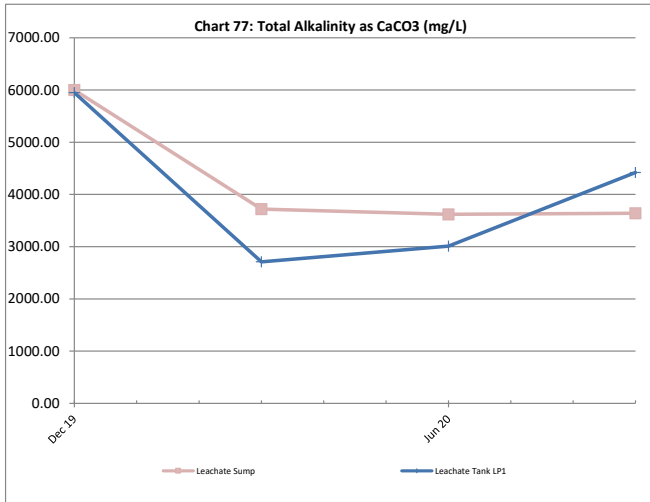
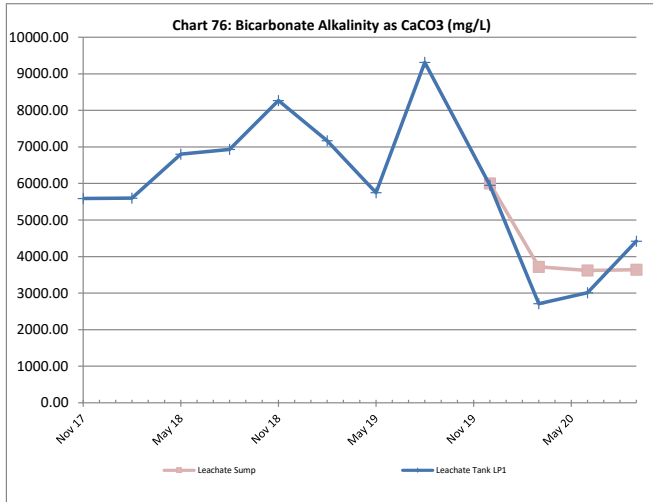
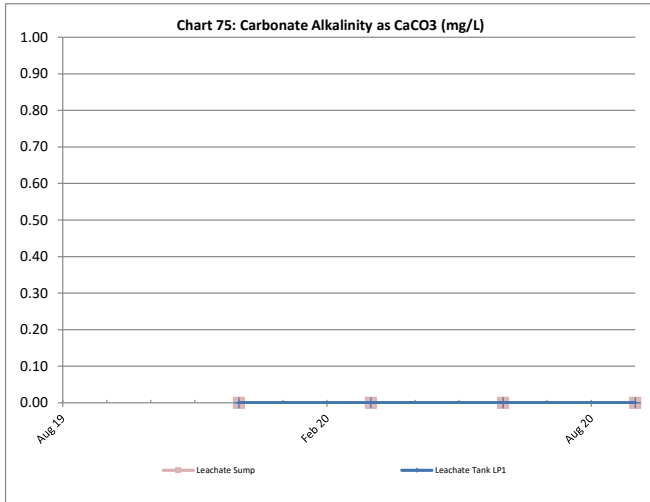


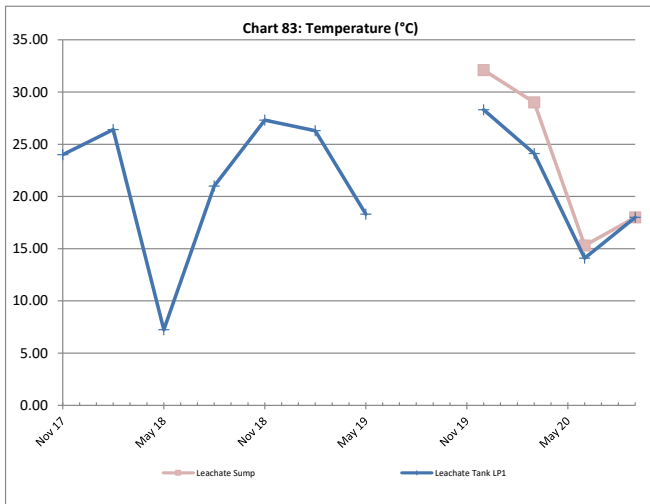
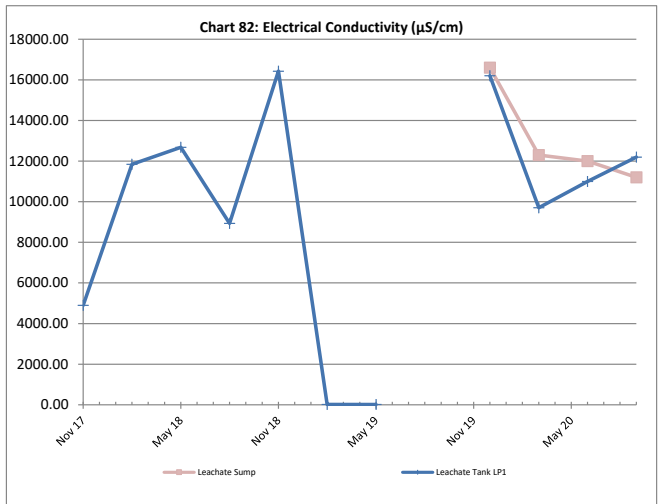
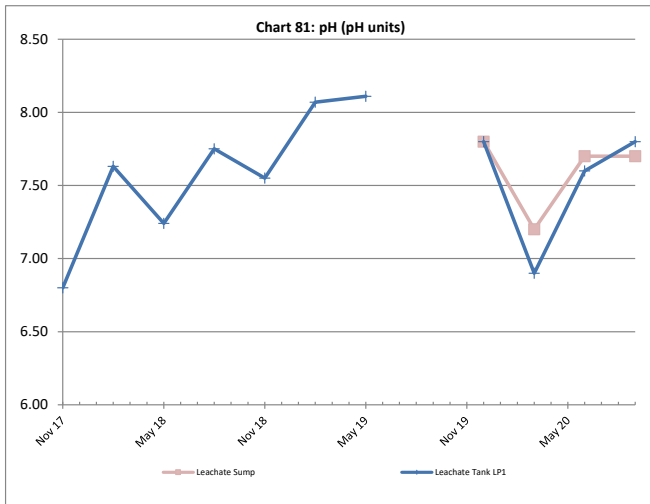


Charts 63-83: Leachate Results









APPENDICES

Appendix A

EPL 5984 Sampling Point Summary (NSW EPA, 04/03/2020)

1	Overflow drain	Catch drain collecting overflows from Sediment Dams 1 & 2 and labelled SWP1 on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
2	Leachate monitoring	Leachate tank labelled LP1 on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
3	Groundwater monitoring	BH1c - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
5	Groundwater monitoring	BH3 - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
6	Groundwater monitoring	BH4 - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
7	Groundwater monitoring	BH15 - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
10	Groundwater monitoring	BH13 - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
11	Groundwater monitoring	BH14 - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
16	Groundwater monitoring	BH19 - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
17	Groundwater monitoring	BH12R - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).

18	Groundwater monitoring	BH9 - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
19	Surface Water Monitoring	SWC_2 - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
20	Surface Water Monitoring	SWC_UP - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
21	Surface Water Monitoring	SWC_DOWN - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).
22	Surface Water Monitoring	SWC_DOWN2 - as shown on the drawing titled "Shellharbour City Council - Dunmore, NSW - Site Layout - Figure no. 1" dated July 2019 (EPA Ref. no. DOC19/1027702).

Appendix B

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



CHAIN OF CUSTODY

ALS Laboratory: please tick →

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

Newcastle: 5 Rosegum Rd, Warabrook NSW 2304
Ph:02 4968 9433 E:samples.newcastle@alsenviro.com

Brisbane: 32 Shand St, Stafford QLD 4053
Ph:07 3243 7222 E:samples.brisbane@alsenviro.com

Townsville: 14-15 Desma Ct, Bohie QLD 4818
Ph:07 4759 0800 E:townsville.environmental@alsenviro.com

Melbourne: 2-4 Westall Rd, Springvale VIC 3171
Ph:03 8549 9600 E:samples.melbourne@alsenviro.com

Adelaide: 2-1 Burma Rd, Poonaka SA 5095
Ph: 08 8359 0890 E:adelaide@alsenviro.com

Perth: 10 Ford Way, Malaga WA 6090
Ph: 08 9209 7865 E:samples.perth@alsenviro.com

Launceston: 27 Westall Rd, Launceston TAS 7290
Ph: 03 6331 2158 E:1

CLIENT:	Shellharbour City Council	TURNAROUND REQUIREMENTS:	<input type="checkbox"/> Standard TAT (List due date):
OFFICE:	41 Burelli St WOLLONGONG NSW 2500	(Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	<input type="checkbox"/> Non Standard or urgent TAT (List due date):
PROJECT:	Dunmore Quarterly Surface Waters	ALS QUOTE NO.:	WO/30/19 TENDER
ORDER NUMBER:		COC SEQUENCE NUMBER (Circle)	
PROJECT MANAGER:	Joel Culton	COC:	1 2 3 4 5 6 7
		OF:	1 2 3 4 5 6 7
SAMPLER:	SAMPLER MOBILE:	RELINQUISHED BY:	RECEIVED BY:
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	Glenn	Aneta
Email Reports to :		DATE/TIME:	DATE/TIME:
Email Invoice to :		17.12.19	17.12.19
COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:	CC reports to:		

FOR LABO
Custody Seal
Free call / no
receipt
Random Sam
Other comm

Environmental Division
Wollongong
Work Order Reference
EW1905497



Telephone : 02 42253126

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) 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 (refer to codes below)	TOTAL BOTTLES	TSS	NT-1, NT-2 (Ionic Balance)	TOC & BOD	Dissolved and Total Fe	Turbidity	NH4 & NO3		Alkalinity
	SWP1		17.12.19 11:30	W	500ml P, VS, AP, N x 2	5	✓	✓		✓	✓			Field Tests - pH
	SWP2		9:15	W			✓	✓		✓	✓			Field Tests - pH
	SWP4 - Sand Mine Dam		11:16	W	VS		✓	✓	✓	✓	✓			Field Tests - pH
	SWP5		11:00	W	VS		✓	✓	✓	✓	✓		Drill	Field Tests - pH
	SWC_UP		10:06	W	SP		✓	✓		✓	✓	✓		Field Tests - pH & Temp
	SWC_2		10:06	W	SP		✓	✓		✓	✓		✓	Field Tests - pH & Temp
	SWC_DOWN		10:25	W	SP		✓	✓		✓	✓	✓		Field Tests - pH & Temp
	SWC_DOWN_2		10:20	W	SP		✓	✓		✓	✓	✓		Field Tests - pH & Temp
						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
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl 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 : **EW1905497**
Client : **SHELLHARBOUR CITY COUNCIL**
Contact : Joel Coulton
Address : LAMERTON HOUSE, LAMERTON CRESCENT
 SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529

Telephone : ----
Project : Dunmore Quarterly Surface Water
Order number : TBA
C-O-C number : ----
Sampler : Aneta Prosaroski, Glenn Davies
Site : DUNMORE LANDFILL TENDER
Quote number : WO/030/19 TENDER SURFACE WATER
No. of samples received : 8
No. of samples analysed : 8

Page : 1 of 6
Laboratory : Environmental Division NSW South Coast
Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500
 4/13 Geary Pl, North Nowra 2541
 Australia NSW Australia
Telephone : +61 2 4225 3125
Date Samples Received : 17-Dec-2019 16:30
Date Analysis Commenced : 17-Dec-2019
Issue Date : 06-Jan-2020 11:18



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ashesh Patel	Senior Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Robert DaLio	Sampler	Laboratory - Wollongong, NSW



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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 Contact 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.

- EG020: Some samples were diluted and rerun due to matrix interference and LOR's have been raised accordingly. (High Total Dissolved Solids)
- ED041G:LOR raised for Sulfate analysis on various samples due to sample matrix.
- Sampling and sample data supplied by ALS Wollongong.
- Sampling Completed as per 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.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SWP1	SWP2	SWP4 - Sand Mine Dam	SWP5	SWC_UP
Client sampling date / time				17-Dec-2019 11:30	17-Dec-2019 09:15	17-Dec-2019 11:16	17-Dec-2019 11:00	17-Dec-2019 10:16	
Compound	CAS Number	LOR	Unit	EW1905497-001	EW1905497-002	EW1905497-003	EW1905497-004	EW1905497-005	
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit	7.1	7.8	8.7	----	7.2	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	44	9	30	----	<5	
EA045: Turbidity									
Turbidity	----	0.1	NTU	25.5	3.5	9.0	----	1.2	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	----	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	34	----	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	148	536	350	----	207	
Total Alkalinity as CaCO3	----	1	mg/L	148	536	383	----	207	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<5	207	316	----	2880	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	53	399	447	----	18300	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	31	95	53	----	463	
Magnesium	7439-95-4	1	mg/L	12	56	68	----	1340	
Sodium	7440-23-5	1	mg/L	48	341	380	----	11000	
Potassium	7440-09-7	1	mg/L	7	30	20	----	401	
EG020F: Dissolved Metals by ICP-MS									
Iron	7439-89-6	0.05	mg/L	0.72	<0.05	<0.05	----	0.10	
EG020T: Total Metals by ICP-MS									
Iron	7439-89-6	0.05	mg/L	3.03	0.07	0.20	----	<0.50	
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	14798-03-9_N	0.01	mg/L	----	----	----	----	0.50	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	----	----	----	----	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	----	----	----	----	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	----	----	----	----	<0.01	
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L	4.45	26.3	26.8	----	580	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SWP1	SWP2	SWP4 - Sand Mine Dam	SWP5	SWC_UP
Client sampling date / time				17-Dec-2019 11:30	17-Dec-2019 09:15	17-Dec-2019 11:16	17-Dec-2019 11:00	17-Dec-2019 10:16	
Compound	CAS Number	LOR	Unit	EW1905497-001	EW1905497-002	EW1905497-003	EW1905497-004	EW1905497-005	
				Result	Result	Result	Result	Result	
EN055: Ionic Balance - Continued									
∅ Total Cations	----	0.01	meq/L	4.80	24.9	25.3	----	622	
∅ Ionic Balance	----	0.01	%	3.78	2.59	2.99	----	3.48	
EN67 PK: Field Tests									
Field Observations	----	0.01	--	----	----	----	dry	----	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	----	----	46	----	----	
EP030: Biochemical Oxygen Demand (BOD)									
Biochemical Oxygen Demand	----	2	mg/L	----	----	3	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SWC_2	SWC_DOWN	SWC_DOWN 2	----	----
Client sampling date / time				17-Dec-2019 10:06	17-Dec-2019 10:25	17-Dec-2019 10:20	----	----	
Compound	CAS Number	LOR	Unit	EW1905497-006	EW1905497-007	EW1905497-008	-----	-----	
				Result	Result	Result	----	----	
EA005FD: Field pH									
pH	----	0.1	pH Unit	7.1	7.4	7.6	----	----	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	<5	5	56	----	----	
EA045: Turbidity									
Turbidity	----	0.1	NTU	----	1.4	17.9	----	----	
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	202	202	186	----	----	
Total Alkalinity as CaCO3	----	1	mg/L	202	202	186	----	----	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	----	2850	2940	----	----	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	----	18100	18400	----	----	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	----	452	461	----	----	
Magnesium	7439-95-4	1	mg/L	----	1330	1420	----	----	
Sodium	7440-23-5	1	mg/L	----	11000	11800	----	----	
Potassium	7440-09-7	1	mg/L	----	396	415	----	----	
EG020F: Dissolved Metals by ICP-MS									
Iron	7439-89-6	0.05	mg/L	<0.10	<0.10	<0.10	----	----	
EG020T: Total Metals by ICP-MS									
Iron	7439-89-6	0.05	mg/L	<0.50	<0.50	1.48	----	----	
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	14798-03-9_N	0.01	mg/L	0.48	0.28	0.03	----	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<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	<0.01	0.05	----	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.05	----	----	
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L	----	574	584	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SWC_2	SWC_DOWN	SWC_DOWN 2	----	----
Client sampling date / time				17-Dec-2019 10:06	17-Dec-2019 10:25	17-Dec-2019 10:20	----	----	
Compound	CAS Number	LOR	Unit	EW1905497-006	EW1905497-007	EW1905497-008	-----	-----	
				Result	Result	Result	----	----	
EN055: Ionic Balance - Continued									
∅ Total Cations	----	0.01	meq/L	----	621	664	----	----	
∅ Ionic Balance	----	0.01	%	----	3.91	6.39	----	----	

CERTIFICATE OF ANALYSIS

Work Order : **EW1905498**
Client : **SHELLHARBOUR CITY COUNCIL**
Contact : Joel Coulton
Address : LAMERTON HOUSE, LAMERTON CRESCENT
 SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529

Telephone : ----
Project : Dunmore Quarterly Leachate
Order number : TBA.
C-O-C number : ----
Sampler : Aneta Prosaroski, Glenn Davies
Site : DUNMORE LANDFILL TENDER
Quote number : WO/030/19 TENDER LEACHATE
No. of samples received : 2
No. of samples analysed : 2

Page : 1 of 4
Laboratory : Environmental Division NSW South Coast
Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500
 4/13 Geary Pl, North Nowra 2541
 Australia NSW Australia
Telephone : +61 2 4225 3125
Date Samples Received : 17-Dec-2019 15:50
Date Analysis Commenced : 17-Dec-2019
Issue Date : 31-Dec-2019 09:29



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

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<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Robert DaLio	Sampler	Laboratory - Wollongong, NSW



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^ = 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.

- ED041G: LOR raised for Sulfate on various samples due to sample matrix.
- EK057G: LOR raised for Nitrite on sample No.2 due to sample matrix.
- EK059G-EK058G: LOR raised for NOx-Nitrate on sample 2 due to sample matrix.
- Sampling and sample data supplied by ALS Wollongong.
- Sampling Completed as per 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.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Leachate Sump	Leachate Tank LP1	----	----	----
Client sampling date / time				17-Dec-2019 13:30	17-Dec-2019 13:45	----	----	----	
Compound	CAS Number	LOR	Unit	EW1905498-001	EW1905498-002	-----	-----	-----	
				Result	Result	----	----	----	
EA005FD: Field pH									
pH	----	0.1	pH Unit	7.8	7.8	----	----	----	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	16600	16200	----	----	----	
EA116: Temperature									
Temperature	----	0.1	°C	32.1	28.3	----	----	----	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	----	----	----	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	----	----	----	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	6000	5950	----	----	----	
Total Alkalinity as CaCO3	----	1	mg/L	6000	5950	----	----	----	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<5	<5	----	----	----	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	2050	1990	----	----	----	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	105	122	----	----	----	
Potassium	7440-09-7	1	mg/L	502	560	----	----	----	
EG020T: Total Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L	0.412	0.425	----	----	----	
Iron	7439-89-6	0.05	mg/L	3.22	3.52	----	----	----	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.8	0.9	----	----	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	1400	1450	----	----	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	0.68	<0.10	----	----	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.01	<0.10	----	----	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.69	<0.10	----	----	----	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	900	870	----	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Leachate Sump	Leachate Tank LP1	----	----	----
Client sampling date / time				17-Dec-2019 13:30	17-Dec-2019 13:45	----	----	----	
Compound	CAS Number	LOR	Unit	EW1905498-001	EW1905498-002	-----	-----	-----	
				Result	Result	----	----	----	
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L	1.65	4.33	----	----	----	
Dissolved Oxygen - % Saturation	----	0.1	% saturation	23.7	56.9	----	----	----	



ALS Laboratory: please tick →

Ph: 02 8784 6585 E: samples.sydney@alsenviro.com
Newcastle: 5 Rosegum Rd, Warabrook NSW 2304
Ph: 02 4968 3433 E: samples.newcastle@alsenviro.comPh: 07 3743 7232 E: samples.brisbane@alsenviro.com
Townsville: 14-15 Desma Ct, Bohle QLD 4813
Ph: 07 4756 3600 E: townsville.environmental@alsenviro.comPh: 08 8269 7655 E: samples.melbourne@alsenviro.com
Adelaide: 2-1 Burma Rd, Pooraka SA 5066
Ph: 08 8359 0890 E: adelaide@alsenviro.comPh: 08 8269 7655 E: samples.perth@alsenviro.com
Launceston: 27 Wellington St, Launceston TAS 7250
Ph: 03 8231 2158 E: launceston@alsenviro.com

CLIENT: Shellharbour City Council	TURNAROUND REQUIREMENTS : <input type="checkbox"/> Standard TAT (List due date):		FOR	
OFFICE: 41 Burelli St WOLLONGONG NSW 2500	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) <input type="checkbox"/> Non Standard or urgent TAT (List due date):		COC	
PROJECT: Dunmore Quarterly Ground Waters	ALS QUOTE NO.: WO/030/19 TENDER	COC SEQUENCE NUMBER (Circle)		
ORDER NUMBER:		COC: 1 2 3 4 5 6 7	Other	
PROJECT MANAGER: Joel Culton		OF: 1 2 3 4 5 6 7	Other	
SAMPLER:	SAMPLER MOBILE:	RELINQUISHED BY: Glenn	RECEIVED BY: Aneta	RELINQUISH DATE/TIME:
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	DATE/TIME: 17/12/19	DATE/TIME: 17/12/19	DATE/TIME:
Email Reports to :				
Email Invoice to :				

Environmental Division
Wollongong
Work Order Reference
EW1905499

Telephone : 02 42253125

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

LAB ID	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be lis Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).					Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
	DATE / TIME	MATRIX				Ammonia	NT-2A (Alka, So4, Cl, F) Filtered Ca, K	TOC	Dissolved Fe & Mn	NT-4 (NO2, NO3)	
BHA	17/12/19 12:23	W	500ml P, SP, VS, N,	4	✓	✓	✓	✓	✓		Field Tests - pH, EC, Temp & SWL
BH1C	8:39	W			✓	✓	✓	✓	✓		Field Tests - pH, EC, Temp & SWL
BH2	8:59	W			✓	✓	✓	✓	✓		Field Tests - pH, EC, Temp & SWL
BH3	11:03	W			✓	✓	✓	✓	✓		Field Tests - pH, EC, Temp & SWL
BH4	9:22	W			✓	✓	✓	✓	✓		Field Tests - pH, EC, Temp & SWL
BH9	11:44	W			✓	✓	✓	✓	✓		Field Tests - pH, EC, Temp & SWL
BH10	15:28	W			✓	✓	✓	✓	✓		Field Tests - pH, EC, Temp & SWL
BH15	15:00	W			✓	✓	✓	✓	✓		Field Tests - pH, EC, Temp & SWL
BH12R	13:20	W			✓	✓	✓	✓	✓		Field Tests - pH, EC, Temp & SWL
BH13	13:03	W			✓	✓	✓	✓	✓		Field Tests - pH, EC, Temp & SWL
BH14	10:47	W			✓	✓	✓	✓	✓		Field Tests - pH, EC, Temp & SWL
BH16	~	W			✓	✓	✓	✓	✓	can't find	Field Tests - pH, EC, Temp & SWL
BH17R	12:45	W			✓	✓	✓	✓	✓		Field Tests - pH, EC, Temp & SWL
BH18R	15:20	W			✓	✓	✓	✓	✓	DRY.	Field Tests - pH, EC, Temp & SWL
BH19R	9:32	W			✓	✓	✓	✓	✓		Field Tests - pH, EC, Temp & SWL
BH20	9:45	W			✓	✓	✓	✓	✓		Field Tests - pH, EC, Temp & SWL
BH20s	9:54	W			✓	✓	✓	✓	✓		Field Tests - pH, EC, Temp & SWL
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
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl 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.

ENFR204

CERTIFICATE OF ANALYSIS

Work Order : **EW1905499**
Client : **SHELLHARBOUR CITY COUNCIL**
Contact : Joel Coulton
Address : LAMERTON HOUSE, LAMERTON CRESCENT
 SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529

Telephone : ----
Project : Dunmore Quarterly Groundwaters
Order number : TBA
C-O-C number : ----
Sampler : Aneta Prosaroski, Glenn Davies
Site : DUNMORE LANDFILL TENDER
Quote number : WO/030/19 TENDER GROUNDWATERS
No. of samples received : 17
No. of samples analysed : 17

Page : 1 of 10
Laboratory : Environmental Division NSW South Coast
Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500
 4/13 Geary Pl, North Nowra 2541
 Australia NSW Australia
Telephone : +61 2 4225 3125
Date Samples Received : 17-Dec-2019 16:30
Date Analysis Commenced : 17-Dec-2019
Issue Date : 28-Dec-2019 06:54



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

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Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Robert DaLio	Sampler	Laboratory - Wollongong, NSW



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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 Contact 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
∅ = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- ED041G:LOR raised for Sulfate analysis on various samples due to sample matrix.
- Sampling and sample data supplied by ALS Wollongong.
- Sampling completed as per EN/67.11 Groundwater 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.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BHA	BH1C	BH2	BH3	BH4
Client sampling date / time				17-Dec-2019 12:23	17-Dec-2019 08:39	17-Dec-2019 08:59	17-Dec-2019 11:03	17-Dec-2019 09:22	
Compound	CAS Number	LOR	Unit	EW1905499-001	EW1905499-002	EW1905499-003	EW1905499-004	EW1905499-005	
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit	6.3	7.0	7.1	7.2	7.1	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	1100	7360	2360	1800	1730	
EA116: Temperature									
Temperature	----	0.1	°C	20.1	22.9	22.2	19.0	18.8	
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	260	2880	783	408	540	
Total Alkalinity as CaCO3	----	1	mg/L	260	2880	783	408	540	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	291	<5	90	126	141	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	50	951	322	254	200	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	135	147	136	152	183	
Potassium	7440-09-7	1	mg/L	12	231	30	33	18	
EG020F: Dissolved Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L	0.089	0.098	0.844	0.171	0.252	
Iron	7439-89-6	0.05	mg/L	3.10	10.9	8.62	2.04	4.08	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	<0.1	0.4	0.7	0.2	0.1	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.21	380	17.3	34.3	6.13	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	0.04	<0.01	<0.01	0.11	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.56	<0.01	<0.01	10.6	0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.60	<0.01	<0.01	10.7	0.01	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	26	218	44	16	20	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BHA	BH1C	BH2	BH3	BH4
Client sampling date / time				17-Dec-2019 12:23	17-Dec-2019 08:39	17-Dec-2019 08:59	17-Dec-2019 11:03	17-Dec-2019 09:22	
Compound	CAS Number	LOR	Unit	EW1905499-001	EW1905499-002	EW1905499-003	EW1905499-004	EW1905499-005	
				Result	Result	Result	Result	Result	
FWI-EN/001: Groundwater Sampling - Depth									
Standing Water Level	----	0.01	m AHD	3.52	3.72	4.27	3.30	4.56	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH9	BH10	BH15	BH12R	BH13
Client sampling date / time				17-Dec-2019 11:44	17-Dec-2019 15:28	17-Dec-2019 15:00	17-Dec-2019 13:20	17-Dec-2019 13:03	
Compound	CAS Number	LOR	Unit	EW1905499-006	EW1905499-007	EW1905499-008	EW1905499-009	EW1905499-010	
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit	6.7	6.7	6.7	6.6	6.9	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	4780	2330	10400	2550	1840	
EA116: Temperature									
Temperature	----	0.1	°C	22.1	22.2	20.9	22.4	25.8	
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	1950	433	938	617	612	
Total Alkalinity as CaCO3	----	1	mg/L	1950	433	938	617	612	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<10	70	440	256	311	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	620	449	2740	260	104	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	215	27	214	292	197	
Potassium	7440-09-7	1	mg/L	88	10	694	48	61	
EG020F: Dissolved Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L	0.679	0.160	0.444	0.525	0.208	
Iron	7439-89-6	0.05	mg/L	0.35	0.15	12.8	0.06	0.13	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.3	0.7	0.4	0.3	0.4	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	143	1.91	111	0.15	1.24	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.03	0.03	0.42	0.08	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.22	0.13	0.29	68.4	7.28	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.22	0.16	0.32	68.8	7.36	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	121	11	170	17	27	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH9	BH10	BH15	BH12R	BH13
Client sampling date / time					17-Dec-2019 11:44	17-Dec-2019 15:28	17-Dec-2019 15:00	17-Dec-2019 13:20	17-Dec-2019 13:03
Compound	CAS Number	LOR	Unit		EW1905499-006	EW1905499-007	EW1905499-008	EW1905499-009	EW1905499-010
					Result	Result	Result	Result	Result
FWI-EN/001: Groundwater Sampling - Depth									
Standing Water Level	----	0.01	m AHD		3.80	1.67	0.95	4.59	4.57



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH14	BH16	BH17R	BH18R	BH19R
Client sampling date / time				17-Dec-2019 10:47	17-Dec-2019 00:00	17-Dec-2019 12:45	17-Dec-2019 15:20	17-Dec-2019 09:32	
Compound	CAS Number	LOR	Unit	EW1905499-011	EW1905499-012	EW1905499-013	EW1905499-014	EW1905499-015	
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit	6.8	----	6.7	----	7.1	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	1970	----	2160	----	1940	
EA116: Temperature									
Temperature	----	0.1	°C	21.5	----	19.9	----	19.0	
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	704	----	444	----	501	
Total Alkalinity as CaCO3	----	1	mg/L	704	----	444	----	501	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	108	----	158	----	201	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	243	----	389	----	270	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	186	----	161	----	159	
Potassium	7440-09-7	1	mg/L	21	----	55	----	21	
EG020F: Dissolved Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L	0.247	----	0.225	----	0.118	
Iron	7439-89-6	0.05	mg/L	0.50	----	14.9	----	0.17	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.8	----	0.2	----	0.2	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	2.86	----	12.9	----	5.43	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	0.02	----	0.02	----	0.09	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	1.60	----	<0.01	----	0.05	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	1.62	----	0.02	----	0.14	
EN67 PK: Field Tests									
Field Observations	----	0.01	--	----	not found	----	dry	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH14	BH16	BH17R	BH18R	BH19R
Client sampling date / time					17-Dec-2019 10:47	17-Dec-2019 00:00	17-Dec-2019 12:45	17-Dec-2019 15:20	17-Dec-2019 09:32
Compound	CAS Number	LOR	Unit		EW1905499-011	EW1905499-012	EW1905499-013	EW1905499-014	EW1905499-015
					Result	Result	Result	Result	Result
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		32	----	32	----	32
FWI-EN/001: Groundwater Sampling - Depth									
Standing Water Level	----	0.01	m AHD		5.07	----	3.80	----	4.69



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID			BH20	BH20s	----	----	----
Client sampling date / time				17-Dec-2019 09:45	17-Dec-2019 09:54	----	----	----	----	----	
Compound	CAS Number	LOR	Unit	EW1905499-016	EW1905499-017	-----	-----	-----	-----	-----	
				Result	Result	----	----	----	----	----	
EA005FD: Field pH											
pH	----	0.1	pH Unit	7.4	7.4	----	----	----	----	----	
EA010FD: Field Conductivity											
Electrical Conductivity (Non Compensated)	----	1	µS/cm	1630	1340	----	----	----	----	----	
EA116: Temperature											
Temperature	----	0.1	°C	18.5	19.0	----	----	----	----	----	
ED037P: Alkalinity by PC Titrator											
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	----	----	----	----	----	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	----	----	----	----	----	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	393	387	----	----	----	----	----	
Total Alkalinity as CaCO3	----	1	mg/L	393	387	----	----	----	----	----	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA											
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	170	240	----	----	----	----	----	
ED045G: Chloride by Discrete Analyser											
Chloride	16887-00-6	1	mg/L	210	60	----	----	----	----	----	
ED093F: Dissolved Major Cations											
Calcium	7440-70-2	1	mg/L	154	134	----	----	----	----	----	
Potassium	7440-09-7	1	mg/L	52	85	----	----	----	----	----	
EG020F: Dissolved Metals by ICP-MS											
Manganese	7439-96-5	0.001	mg/L	0.070	0.088	----	----	----	----	----	
Iron	7439-89-6	0.05	mg/L	1.36	<0.05	----	----	----	----	----	
EK040P: Fluoride by PC Titrator											
Fluoride	16984-48-8	0.1	mg/L	0.2	0.2	----	----	----	----	----	
EK055G: Ammonia as N by Discrete Analyser											
Ammonia as N	7664-41-7	0.01	mg/L	37.2	3.33	----	----	----	----	----	
EK057G: Nitrite as N by Discrete Analyser											
Nitrite as N	14797-65-0	0.01	mg/L	0.01	<0.01	----	----	----	----	----	
EK058G: Nitrate as N by Discrete Analyser											
Nitrate as N	14797-55-8	0.01	mg/L	0.08	3.78	----	----	----	----	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser											
Nitrite + Nitrate as N	----	0.01	mg/L	0.09	3.78	----	----	----	----	----	
EP005: Total Organic Carbon (TOC)											
Total Organic Carbon	----	1	mg/L	20	18	----	----	----	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH20	BH20s	----	----	----
Client sampling date / time				17-Dec-2019 09:45	17-Dec-2019 09:54	----	----	----	
Compound	CAS Number	LOR	Unit	EW1905499-016	EW1905499-017	-----	-----	-----	
				Result	Result	----	----	----	
FWI-EN/001: Groundwater Sampling - Depth									
Standing Water Level	----	0.01	m AHD	2.41	2.44	----	----	----	

CERTIFICATE OF ANALYSIS

Work Order : **EW2001278**
Client : **SHELLHARBOUR CITY COUNCIL**
Contact : Joel Coulton
Address : LAMERTON HOUSE, LAMERTON CRESCENT
 SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529

Telephone : ----
Project : Dunmore Quarterly Groundwaters EPL
Order number : 126450
C-O-C number : ----
Sampler : Glenn Davies
Site : DUNMORE LANDFILL TENDER
Quote number : WO/030/19 TENDER GROUNDWATERS
No. of samples received : 6
No. of samples analysed : 6

Page : 1 of 4
Laboratory : Environmental Division NSW South Coast
Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500
 4/13 Geary Pl, North Nowra 2541
 Australia NSW Australia
Telephone : +61 2 4225 3125
Date Samples Received : 11-Mar-2020 16:00
Date Analysis Commenced : 11-Mar-2020
Issue Date : 18-Mar-2020 16:32



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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 Contact 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 analysis due to sample matrix.
- Sampling and Field Tests supplied by ALS Wollongong.
- Sampling completed as per EN/67.11 Groundwater Sampling.
- Field tests completed on day of sampling/receipt.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID				
Client sampling date / time				BH1C Point 3	BH3 Point 5	BH4 Point 6	BH15 Point 7	BH13 Point 10
Client sampling date / time				11-Mar-2020 11:49	11-Mar-2020 11:35	11-Mar-2020 12:52	11-Mar-2020 14:20	11-Mar-2020 13:43
Compound	CAS Number	LOR	Unit	EW2001278-001	EW2001278-002	EW2001278-003	EW2001278-004	EW2001278-005
				Result	Result	Result	Result	Result
EA005FD: Field pH								
pH	----	0.1	pH Unit	7.4	5.6	6.5	6.0	6.8
EA010FD: Field Conductivity								
Electrical Conductivity (Non Compensated)	----	1	µS/cm	6970	2180	1100	1160	1300
EA116: Temperature								
Temperature	----	0.1	°C	27.2	20.1	21.4	19.4	24.1
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	2360	460	294	639	434
Total Alkalinity as CaCO3	----	1	mg/L	2360	460	294	639	434
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<10	86	99	586	125
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	934	328	112	3260	48
EG020F: Dissolved Metals by ICP-MS								
Manganese	7439-96-5	0.001	mg/L	0.107	0.050	0.102	0.754	0.087
Iron	7439-89-6	0.05	mg/L	17.3	<0.05	0.46	25.7	<0.05
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	0.2	0.1	<0.1	0.2	0.2
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	377	32.5	1.77	69.6	0.15
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	0.08	0.05	0.02	0.03	0.06
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	0.26	5.77	0.64	0.09	16.0
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.34	5.82	0.66	0.12	16.1
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	167	11	13	145	16
QWI-EN 67.11 Sampling of Groundwaters								
Standing Water Level	----	0.01	m AHD	3.26	3.15	4.35	0.75	4.29



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID			BH14 Point 11	----	----	----	----
Client sampling date / time		11-Mar-2020 13:05			----	----	----	----	----
Compound	CAS Number	LOR	Unit	EW2001278-006	-----	-----	-----	-----	-----
				Result	----	----	----	----	----
EA005FD: Field pH									
pH	----	0.1	pH Unit	5.8	----	----	----	----	----
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	2460	----	----	----	----	----
EA116: Temperature									
Temperature	----	0.1	°C	25.1	----	----	----	----	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	125	----	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	125	----	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	136	----	----	----	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	115	----	----	----	----	----
EG020F: Dissolved Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L	0.310	----	----	----	----	----
Iron	7439-89-6	0.05	mg/L	0.06	----	----	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.3	----	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.04	----	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	0.30	----	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	202	----	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	202	----	----	----	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	49	----	----	----	----	----
QWI-EN 67.11 Sampling of Groundwaters									
Standing Water Level	----	0.01	m AHD	4.74	----	----	----	----	----

CERTIFICATE OF ANALYSIS

Work Order : **EW2001324**
Client : **SHELLHARBOUR CITY COUNCIL**
Contact : Joel Coulton
Address : LAMERTON HOUSE, LAMERTON CRESCENT
 SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529

Telephone : ----
Project : Dunmore Quarterly Leachate
Order number : 126450
C-O-C number : ----
Sampler : Glenn Davies
Site : DUNMORE LANDFILL TENDER
Quote number : WO/030/19 TENDER LEACHATE
No. of samples received : 1
No. of samples analysed : 1

Page : 1 of 4
Laboratory : Environmental Division NSW South Coast
Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500
 4/13 Geary Pl, North Nowra 2541
 Australia NSW Australia
Telephone : +61 2 4225 3125
Date Samples Received : 11-Mar-2020 16:00
Date Analysis Commenced : 11-Mar-2020
Issue Date : 17-Mar-2020 16:58



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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 Contact 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 due to sample matrix.
- Sampling and Field Tests supplied by ALS Wollongong.
- Field tests completed on day of sampling/receipt.
- Sampling Completed as per 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.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID			Leachate Sump	----	----	----	----
Client sampling date / time		11-Mar-2020 15:25			----	----	----	----	----
Compound	CAS Number	LOR	Unit	EW2001324-001	-----	-----	-----	-----	-----
				Result	----	----	----	----	----
EA005FD: Field pH									
pH	----	0.1	pH Unit	7.2	----	----	----	----	----
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	12300	----	----	----	----	----
EA116: Temperature									
Temperature	----	0.1	°C	29.0	----	----	----	----	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	3720	----	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	3720	----	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	204	----	----	----	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	1480	----	----	----	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	21	----	----	----	----	----
Potassium	7440-09-7	1	mg/L	36	----	----	----	----	----
EG020T: Total Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L	0.616	----	----	----	----	----
Iron	7439-89-6	0.05	mg/L	2.74	----	----	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.4	----	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	1000	----	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.10	----	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.12	----	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.12	----	----	----	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	352	----	----	----	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Leachate Sump	----	----	----	----
Client sampling date / time				11-Mar-2020 15:25	----	----	----	----	
Compound	CAS Number	LOR	Unit	EW2001324-001	-----	-----	-----	-----	
				Result	----	----	----	----	
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L	0.17	----	----	----	----	
Dissolved Oxygen - % Saturation	----	0.1	% saturation	1.9	----	----	----	----	

CERTIFICATE OF ANALYSIS

Work Order : **EW2001325**
Client : **SHELLHARBOUR CITY COUNCIL**
Contact : Joel Coulton
Address : LAMERTON HOUSE, LAMERTON CRESCENT
 SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529

Telephone : ----
Project : Dunmore Quarterly Leachate Tank EPL
Order number : 126450
C-O-C number : ----
Sampler : ----
Site : DUNMORE LANDFILL TENDER
Quote number : WO/030/19 TENDER LEACHATE
No. of samples received : 1
No. of samples analysed : 1

Page : 1 of 4
Laboratory : Environmental Division NSW South Coast
Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500
 4/13 Geary Pl, North Nowra 2541
 Australia NSW Australia
Telephone : +61 2 4225 3125
Date Samples Received : 11-Mar-2020 16:00
Date Analysis Commenced : 11-Mar-2020
Issue Date : 17-Mar-2020 14:14



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

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This Certificate of Analysis contains the following information:

- General Comments
- 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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 Contact 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 due to sample matrix.
- Sampling and Field Tests supplied by ALS Wollongong.
- Field tests completed on day of sampling/receipt.
- Sampling Completed as per 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.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Leachate Storage Tank LP1	----	----	----	----
Client sampling date / time				11-Mar-2020 15:30	----	----	----	----	
Compound	CAS Number	LOR	Unit	EW2001325-001	-----	-----	-----	-----	
				Result	----	----	----	----	
EA005FD: Field pH									
pH	----	0.1	pH Unit	6.9	----	----	----	----	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	9700	----	----	----	----	
EA116: Temperature									
Temperature	----	0.1	°C	24.1	----	----	----	----	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	2710	----	----	----	----	
Total Alkalinity as CaCO3	----	1	mg/L	2710	----	----	----	----	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	205	----	----	----	----	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	1450	----	----	----	----	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	161	----	----	----	----	
Potassium	7440-09-7	1	mg/L	221	----	----	----	----	
EG020T: Total Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L	0.657	----	----	----	----	
Iron	7439-89-6	0.05	mg/L	3.26	----	----	----	----	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.3	----	----	----	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	638	----	----	----	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.10	----	----	----	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.86	----	----	----	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.86	----	----	----	----	
EP005: Total Organic Carbon (TOC)									



Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Client sample ID

				Leachate Storage Tank LP1	----	----	----	----
Client sampling date / time				11-Mar-2020 15:30	----	----	----	----
Compound	CAS Number	LOR	Unit	EW2001325-001	-----	-----	-----	-----
				Result	----	----	----	----
EP005: Total Organic Carbon (TOC) - Continued								
Total Organic Carbon	----	1	mg/L	315	----	----	----	----
EP025FD: Field Dissolved Oxygen								
Dissolved Oxygen	----	0.01	mg/L	2.65	----	----	----	----
Dissolved Oxygen - % Saturation	----	0.1	% saturation	31.5	----	----	----	----



CHAIN OF CUSTODY

ALS Laboratory: please tick →

Sydney: 277 Woodpark Rd, Smithfield NSW 2176
Ph: 02 8784 8555 E: samples.sydney@alsenviro.com
Newcastle: 6 Rosegum Rd, Warabrook NSW 2304
Ph: 02 4968 9433 E: samples.newcastle@alsenviro.com

Brisbane: 32 Stand St, Stafford QLD 4050
Ph: 07 3243 7222 E: samples.brisbane@alsenviro.com
Townsville: 14-15 Desma Ct, Bohle QLD 4818
Ph: 07 4796 0600 E: boonsville.environmental@alsenviro.com

Melbourne: 2-4 Westall Rd, Springvale VIC 3171
Ph: 03 8549 9000 E: samples.melbourne@alsenviro.com
Adelaide: 2-1 Burma Rd, Pooraka SA 5095
Ph: 08 8359 0890 E: adelaide@alsenviro.com

Perth: 10 Hod Way, Malwa WA 6050
Ph: 08 9209 7655 E:
Launceston: 27 V
Ph: 03 6331 2158 E:

Environmental Division
Wollongong
Work Order Reference
EW2001277



Telephone: 02 42263126



CLIENT: Shellharbour City Council	TURNAROUND REQUIREMENTS : <input type="checkbox"/> Standard TAT (List due date):	FOR LAB USE ONLY ALS No. 50 Use For ASSAY Random Other com
OFFICE: 41 Burelli St WOLLONGONG NSW 2500	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) <input type="checkbox"/> Non Standard or urgent TAT (List due date):	
PROJECT: Dunmore Quarterly Surface Waters EPL	ALS QUOTE NO.: WO/030/19 TENDER	COC SEQUENCE NUMBER (Circle)
ORDER NUMBER:		COC: 1 2 3 4 5 6 7
PROJECT MANAGER: Joel Culton		OF: 1 2 3 4 5 6 7
SAMPLER:	SAMPLER MOBILE:	RECEIVED BY: <i>[Signature]</i>
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	DATE/TIME: 11/3/20 16:45
Email Reports to :		DATE/TIME:
Email Invoice to :		DATE/TIME:
COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: CC reports to:		

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) 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 (refer to codes below)	TOTAL BOTTLES	TSS	NT-1, NT-2 (Ionic Balance)	TOC & BOD	Dissolved and Total Fe	Turbidity	NH4 & NO3		Alkalinity
	SWP1	11/3/20 12:11	W				✓	✓	✗	✓	✓			Field Tests - pH
	SWC_2	14:49	W				✓					✓	✓	Field Tests - pH & Temp
	SWC_UP	14:55	W				✓	✓		✓	✓	✓		Field Tests - pH & Temp
	SWC_DOWN	14:58	W				✓	✓		✓	✓	✓		Field Tests - pH & Temp
	SWC_DOWN_2	15:05	W				✓	✓		✓	✓	✓		Field Tests - pH & Temp
						TOTAL	10							

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORG = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl 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 : **EW2001277**
Client : **SHELLHARBOUR CITY COUNCIL**
Contact : Joel Coulton
Address : LAMERTON HOUSE, LAMERTON CRESCENT
 SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529

Telephone : ----
Project : Dunmore Quarterly Surface Water EPL
Order number : 126450
C-O-C number : ----
Sampler : Glenn Davies
Site : DUNMORE LANDFILL TENDER
Quote number : WO/030/19 TENDER SURFACE WATER
No. of samples received : 5
No. of samples analysed : 5

Page : 1 of 4
Laboratory : Environmental Division NSW South Coast
Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500
 4/13 Geary Pl, North Nowra 2541
 Australia NSW Australia
Telephone : +61 2 4225 3125
Date Samples Received : 11-Mar-2020 16:00
Date Analysis Commenced : 11-Mar-2020
Issue Date : 18-Mar-2020 16:32



Accreditation No. 825
 Accredited for compliance with
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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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW



General Comments

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

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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 Contact 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.**
- EG020: Some samples were diluted and rerun due to matrix interference and LOR's have been raised accordingly. (High Total Dissolved Solids)
- Sampling and Field Tests supplied by ALS Wollongong.
- Sampling completed as per EN/67.6 Rivers and Streams
- 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.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SWP1 Point 1	SWC_2 Point 19	SWC_UP Point 20	SWC_Down Point 21	SWC_DOWN_2 Point 22
Client sampling date / time				11-Mar-2020 12:11	11-Mar-2020 14:49	11-Mar-2020 14:55	11-Mar-2020 14:58	11-Mar-2020 15:05	
Compound	CAS Number	LOR	Unit	EW2001277-001	EW2001277-002	EW2001277-003	EW2001277-004	EW2001277-005	
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit	6.8	7.6	7.6	7.6	7.6	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	36	10	<5	8	160	
EA045: Turbidity									
Turbidity	----	0.1	NTU	9.4	----	4.7	4.6	51.6	
EA116: Temperature									
Temperature	----	0.1	°C	----	19.6	22.8	22.4	22.0	
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	103	146	128	123	122	
Total Alkalinity as CaCO3	----	1	mg/L	103	146	128	123	122	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	8	----	1450	1570	1830	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	52	----	9520	10400	11900	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	23	----	239	256	318	
Magnesium	7439-95-4	1	mg/L	8	----	631	697	832	
Sodium	7440-23-5	1	mg/L	31	----	5280	5760	6950	
Potassium	7440-09-7	1	mg/L	12	----	194	212	247	
EG020F: Dissolved Metals by ICP-MS									
Iron	7439-89-6	0.05	mg/L	0.90	0.05	0.07	0.06	<0.10	
EG020T: Total Metals by ICP-MS									
Iron	7439-89-6	0.05	mg/L	2.05	0.70	0.48	0.39	10.5	
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	14798-03-9_N	0.01	mg/L	----	0.06	0.04	0.06	0.08	
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	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	----	0.02	0.01	0.06	0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	----	0.02	0.01	0.06	0.01	



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				SWP1 Point 1	SWC_2 Point 19	SWC_UP Point 20	SWC_Down Point 21	SWC_DOWN_2 Point 22
Client sampling date / time				11-Mar-2020 12:11	11-Mar-2020 14:49	11-Mar-2020 14:55	11-Mar-2020 14:58	11-Mar-2020 15:05
Compound	CAS Number	LOR	Unit	EW2001277-001	EW2001277-002	EW2001277-003	EW2001277-004	EW2001277-005
				Result	Result	Result	Result	Result
EN055: Ionic Balance								
∅ Total Anions	----	0.01	meq/L	3.69	----	301	328	376
∅ Total Cations	----	0.01	meq/L	3.46	----	298	326	393
∅ Ionic Balance	----	0.01	%	3.21	----	0.47	0.37	2.18



CHAIN OF CUSTODY

ALS Laboratory: *please tick* →

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

Newcastle: 5 Rosegum Rd. Warabrook NSW 2304
Ph: 02 4968 9433 E: samples.newcastle@alsenviro.com

Brisbane: 32 Shand St. Stafford QLD 4053
Ph: 07 3243 7222 E: samples.brisbane@alsenviro.com

Townsville: 14-15 Desma Ct. Bohle QLD 4818
Ph: 07 4736 0800 E: townsville.environmental@alsenviro.com

Melbourne: 2-4 Westall Rd. Springvale VIC 3171
Ph: 03 8549 9600 E: samples.melbourne@alsenviro.com

Adelaide: 2-1 Burma Rd. Pooraka SA 5096
Ph: 08 8359 0850 E: adelaide@alsenviro.com

Perth: 10 Hod Way, Malaga WA 6009
Ph: 08 9209 7655 E: samples.perth@alsenviro.com

Launceston: 27 Wellington St, Launceston TAS 7250
Ph: 7

CLIENT:	Shellharbour City Council	TURNAROUND REQUIREMENTS:	<input type="checkbox"/> Standard TAT (List due date):
OFFICE:	41 Burelli St WOLLONGONG NSW 2500	(Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	<input type="checkbox"/> Non Standard or urgent TAT (List due date):
PROJECT:	Dunmore Quarterly Surface Waters	ALS QUOTE NO.:	WO/030/19 TENDER
ORDER NUMBER:		COC SEQUENCE NUMBER (Circle)	
PROJECT MANAGER:	Joel Culton	COC:	1 2 3 4 5 6 7
SAMPLER:		OF:	1 2 3 4 5 6 7
SAMPLER MOBILE:		RELINQUISHED BY:	REI
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	DATE/TIME:	DA
Email Reports to :		11/3/20	11/3/20 16:45
Email Invoice to :			

Environmental Division
Wollongong
Work Order Reference
EW2001326



Telephone : 02 42253125

No	N/A
No	N/A
C	

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

ALS USE ONLY	SAMPLE DETAILS			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price)						Additional Information		
	LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	TSS	NT-1, NT-2 (Ionic Balance)	TOC & BOD	Dissolved and Total Fe	Turbidity		NH4 & NO3	Alkalinity
	SWP2		11.3.20 12:26	W			✓	✓		✓	✓			Field Tests - pH
	SWP4 - Sand Mine Dam		12:18	W			✓	✓	✓	✓	✓			Field Tests - pH
	SWP5		13:40	W			✓	✓	✓	✓	✓	DRY		Field Tests - pH
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
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl 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 : **EW2001326**
Client : **SHELLHARBOUR CITY COUNCIL**
Contact : Joel Coulton
Address : LAMERTON HOUSE, LAMERTON CRESCENT
 SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529

Telephone : ----
Project : Dunmore Quarterly Surface Water
Order number : 126450
C-O-C number : ----
Sampler : Glenn Davies
Site : DUNMORE LANDFILL TENDER
Quote number : WO/030/19 TENDER SURFACE WATER
No. of samples received : 3
No. of samples analysed : 3

Page : 1 of 3
Laboratory : Environmental Division NSW South Coast
Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500
 4/13 Geary Pl, North Nowra 2541
 Australia NSW Australia
Telephone : +61 2 4225 3125
Date Samples Received : 11-Mar-2020 16:00
Date Analysis Commenced : 11-Mar-2020
Issue Date : 18-Mar-2020 16:32



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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 Contact 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.**
- Sampling and Field Tests supplied by ALS Wollongong.
- Field tests completed on day of sampling/receipt.
- Sampling Completed as per 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.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SWP2	SWP4 - Sand Mine Dam	SWP5	----	----
Client sampling date / time				11-Mar-2020 12:26	11-Mar-2020 12:18	11-Mar-2020 13:40	----	----	
Compound	CAS Number	LOR	Unit	EW2001326-001	EW2001326-002	EW2001326-003	-----	-----	
				Result	Result	Result	----	----	
EA005FD: Field pH									
pH	----	0.1	pH Unit	7.6	9.0	----	----	----	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	6	25	----	----	----	
EA045: Turbidity									
Turbidity	----	0.1	NTU	3.2	12.6	----	----	----	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	----	----	----	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	14	49	----	----	----	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	407	272	----	----	----	
Total Alkalinity as CaCO3	----	1	mg/L	421	321	----	----	----	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	181	300	----	----	----	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	315	422	----	----	----	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	72	32	----	----	----	
Magnesium	7439-95-4	1	mg/L	40	55	----	----	----	
Sodium	7440-23-5	1	mg/L	230	329	----	----	----	
Potassium	7440-09-7	1	mg/L	24	18	----	----	----	
EG020F: Dissolved Metals by ICP-MS									
Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	----	----	----	
EG020T: Total Metals by ICP-MS									
Iron	7439-89-6	0.05	mg/L	0.10	0.08	----	----	----	
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L	21.1	24.6	----	----	----	
∅ Total Cations	----	0.01	meq/L	17.5	20.9	----	----	----	
∅ Ionic Balance	----	0.01	%	9.24	8.07	----	----	----	
EN67 PK: Field Tests									
Field Observations	----	0.01	--	----	----	dry	----	----	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	----	29	----	----	----	
EP030: Biochemical Oxygen Demand (BOD)									
Biochemical Oxygen Demand	----	2	mg/L	----	4	----	----	----	



CHAIN OF CUSTODY

ALS Laboratory: please tick →

Sydney: 277 Woodpark Rd, Springfield NSW 2176
Ph: 02 8784 6655 E: samples.sydney@alsenviro.com

Brisbane: 52 Strand St, Stafford QLD 4053
Ph: 07 3243 7222 E: samples.brisbane@alsenviro.com

Melbourne: 2-4 Westall Rd, Springvale VIC 3171
Ph: 03 8549 9600 E: samples.melbourne@alsenviro.com

Perth: 10 Hod Way, Malaga WA 6090
Ph: 08 9209 7855 E: samples.perth@alsenviro.com

Newcastle: 5 Rosegum Rd, Warabrook NSW 2304
Ph: 02 4988 9433 E: samples.newcastle@alsenviro.com

Townsville: 14-15 Desma Ct, Bondi QLD 4819
Ph: 07 4756 0600 E: townsville.environmental@alsenviro.com

Adelaide: 2-1 Burma Rd, Prospect SA 5095
Ph: 08 8359 0890 E: adelaide@alsenviro.com

Launceston: 27 Wellington St, Launceston TAS 7250
Ph: 03 6331 2158 E: launceston@alsenviro.com

CLIENT: Shellharbour City Council		TURNAROUND REQUIREMENTS: <input type="checkbox"/> Standard TAT (List due date):		FOR LABORATORY USE ONLY (Circle) <input type="checkbox"/> Standard TAT (List due date): <input type="checkbox"/> Non Standard or urgent TAT (List due date):								
OFFICE: 41 Burrelli St WOLLONGONG NSW 2500		(Standard TAT may be longer for some tests e.g. Ultra Trace Organics)										
PROJECT: Dunmore Quarterly Ground Waters EPL		ALS QUOTE NO.: WO/030/19 TENDER		COC SEQUENCE NUMBER (Circle)								
ORDER NUMBER:				COC: <table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr></table>		1	2	3	4	5	6	7
1	2	3	4	5	6	7						
PROJECT MANAGER: Joel Culton				OF: <table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr></table>		1	2	3	4	5	6	7
1	2	3	4	5	6	7						
SAMPLER:		SAMPLER MOBILE:		RELINQUISHED BY:								
COC emailed to ALS? (YES / NO)		EDD FORMAT (or default):		Aneta								
Email Reports to :				DATE/TIME:								
Email Invoice to :				17/6/20								
				RECEIVED BY:								
				Arrian								
				DATE/TIME:								
				17/6/20								
				RELINQUISHED BY:								
				DATE/TIME:								

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

Environmental Division
Wollongong
Work Order Reference
EW2002778

Telephone: 02 42253125

LAB ID	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract attention) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle)							Field Tests
	SAMPLE ID	DATE / TIME	MATRIX		TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	Ammonia	NT-2A (Alka, So4, Cl, Fij) Filtered Ca, K	TOC	Dissolved Fe & Mn	NT-4 (NO2, NO3)	
BH1C		17/6/20 10:33	W			✓	✓	✓	✓	✓		Field Tests - pH, EC, Temp & SWL
BH3		12:20	W			✓	✓	✓	✓	✓		Field Tests - pH, EC, Temp & SWL
BH4		12:44	W			✓	✓	✓	✓	✓		Field Tests - pH, EC, Temp & SWL
BH9		17/6/20 10:22	W			✓	✓	✓	✓	✓		Field Tests - pH, EC, Temp & SWL
BH12R		10:48	W			✓	✓	✓	✓	✓		Field Tests - pH, EC, Temp & SWL
BH13		11:08	W			✓	✓	✓	✓	✓		Field Tests - pH, EC, Temp & SWL
BH14		12:30	W			✓	✓	✓	✓	✓		Field Tests - pH, EC, Temp & SWL
BH15		11:00	W			✓	✓	✓	✓	✓		Field Tests - pH, EC, Temp & SWL
BH19R		12:08	W			✓	✓	✓	✓	✓		Field Tests - pH, EC, Temp & SWL
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
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl 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 : **EW2002778**
Client : **SHELLHARBOUR CITY COUNCIL**
Contact : Joel Coulton
Address : LAMERTON HOUSE, LAMERTON CRESCENT
 SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529

Telephone : ----
Project : Dunmore Quarterly Groundwaters EPL
Order number : 126450
C-O-C number : ----
Sampler : Glenn Davies, Robert DaLio
Site : DUNMORE LANDFILL TENDER
Quote number : WO/030/19 TENDER GROUNDWATERS
No. of samples received : 9
No. of samples analysed : 9

Page : 1 of 6
Laboratory : Environmental Division NSW South Coast
Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500
 4/13 Geary Pl, North Nowra 2541
 Australia NSW Australia
Telephone : +61 2 4225 3125
Date Samples Received : 17-Jun-2020 15:09
Date Analysis Commenced : 17-Jun-2020
Issue Date : 03-Jul-2020 09:16



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ashesh Patel	Senior Chemist	Sydney Inorganics, Smithfield, NSW
Dian Dao		Sydney Inorganics, Smithfield, NSW
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong, NSW
Hoa Nguyen	Senior Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	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 Contact 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 samples 1 and 8 due to sample matrix.
- EK057G/EK058G: LOR raised for Nitrite and Nitrate on samples 1 and 8 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.
- Sampling and groundwater depth measurements completed by ALS Wollongong via inhouse sampling method EN/67.11 Groundwater Sampling.
- Temperature performed by ALS Wollongong via in-house method EA016 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.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH1C	BH3	BH4	BH9	BH12R
Client sampling date / time				17-Jun-2020 10:33	17-Jun-2020 12:20	17-Jun-2020 12:44	17-Jun-2020 10:22	17-Jun-2020 10:48	
Compound	CAS Number	LOR	Unit	EW2002778-001	EW2002778-002	EW2002778-003	EW2002778-004	EW2002778-005	
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit	6.8	7.5	7.2	6.9	6.8	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	6740	1780	2230	4720	2790	
EA116: Temperature									
Temperature	----	0.1	°C	24.5	18.7	18.6	18.3	22.2	
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	414	640	1530	605	
Total Alkalinity as CaCO3	----	1	mg/L	2650	414	640	1530	605	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<10	95	149	<1	420	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	790	259	293	627	425	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	86	148	221	228	309	
Potassium	7440-09-7	1	mg/L	145	32	20	82	66	
EG020F: Dissolved Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L	0.122	0.294	0.244	1.00	0.722	
Iron	7439-89-6	0.05	mg/L	12.9	2.98	5.84	8.24	9.06	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.3	0.1	<0.1	0.4	0.2	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	131	20.4	6.11	48.6	0.92	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.10	0.02	<0.01	0.01	0.05	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.10	16.9	<0.01	<0.01	1.76	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.10	16.9	<0.01	0.01	1.81	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	179	15	21	81	15	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH1C	BH3	BH4	BH9	BH12R
Client sampling date / time				17-Jun-2020 10:33	17-Jun-2020 12:20	17-Jun-2020 12:44	17-Jun-2020 10:22	17-Jun-2020 10:48	
Compound	CAS Number	LOR	Unit	EW2002778-001	EW2002778-002	EW2002778-003	EW2002778-004	EW2002778-005	
				Result	Result	Result	Result	Result	
QWI-EN 67.11 Sampling of Groundwaters									
Standing Water Level	----	0.01	m AHD	3.38	3.15	4.37	2.35	4.42	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH13	BH14	BH15	BH19R	----
Client sampling date / time				17-Jun-2020 11:08	17-Jun-2020 12:30	17-Jun-2020 11:00	17-Jun-2020 12:08	----	
Compound	CAS Number	LOR	Unit	EW2002778-006	EW2002778-007	EW2002778-008	EW2002778-009	-----	
				Result	Result	Result	Result	----	
EA005FD: Field pH									
pH	----	0.1	pH Unit	7.2	6.6	6.8	7.3	----	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	1690	2350	9240	1760	----	
EA116: Temperature									
Temperature	----	0.1	°C	20.3	20.8	18.1	18.5	----	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	----	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	----	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	588	504	690	475	----	
Total Alkalinity as CaCO3	----	1	mg/L	588	504	690	475	----	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	159	122	570	207	----	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	146	275	2970	236	----	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	167	173	194	162	----	
Potassium	7440-09-7	1	mg/L	30	47	632	22	----	
EG020F: Dissolved Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L	0.192	0.323	0.609	0.138	----	
Iron	7439-89-6	0.05	mg/L	0.45	<0.05	19.3	1.73	----	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.2	0.4	0.2	0.1	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	1.13	0.42	60.8	4.23	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	0.02	0.05	<0.10	0.01	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.97	61.4	<0.10	0.07	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.99	61.4	<0.10	0.08	----	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	23	37	148	18	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH13	BH14	BH15	BH19R	----
Client sampling date / time					17-Jun-2020 11:08	17-Jun-2020 12:30	17-Jun-2020 11:00	17-Jun-2020 12:08	----
Compound	CAS Number	LOR	Unit	EW2002778-006	EW2002778-007	EW2002778-008	EW2002778-009	-----	-----
				Result	Result	Result	Result	-----	----
QWI-EN 67.11 Sampling of Groundwaters									
Standing Water Level	----	0.01	m AHD	4.40	4.89	0.74	4.64	-----	----

CERTIFICATE OF ANALYSIS

Work Order : **EW2002776**
Client : **SHELLHARBOUR CITY COUNCIL**
Contact : Joel Coulton
Address : LAMERTON HOUSE, LAMERTON CRESCENT
 SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529

Telephone : ----
Project : Dunmore Quarterly Leachate Tank EPL
Order number : 126450
C-O-C number : ----
Sampler : Glenn Davies, Robert DaLio
Site : DUNMORE LANDFILL TENDER
Quote number : WO/030/19 TENDER LEACHATE
No. of samples received : 1
No. of samples analysed : 1

Page : 1 of 4
Laboratory : Environmental Division NSW South Coast
Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500
 4/13 Geary Pl, North Nowra 2541
 Australia NSW Australia
Telephone : +61 2 4225 3125
Date Samples Received : 17-Jun-2020 14:53
Date Analysis Commenced : 17-Jun-2020
Issue Date : 24-Jun-2020 19:21



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

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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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ashesh Patel	Senior Chemist	Sydney Inorganics, Smithfield, NSW
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong, NSW
Ivan Taylor	Analyst	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.

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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.**
- EK059G: LOR raised for NOx due to sample matrix.
- EK057G/EK058G: LOR raised for Nitrite and Nitrate due to sample matrix.
- 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 EA016 and EN67 PK.
- Dissolved oxygen (DO) performed by ALS Wollongong via in-house method EA025FD and EN67 PK.
- 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.



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				Leachate Storage Tank LP1	----	----	----	----
Client sampling date / time				17-Jun-2020 08:40	----	----	----	----
Compound	CAS Number	LOR	Unit	EW2002776-001	-----	-----	-----	-----
				Result	----	----	----	----
EA005FD: Field pH								
pH	----	0.1	pH Unit	7.6	----	----	----	----
EA010FD: Field Conductivity								
Electrical Conductivity (Non Compensated)	----	1	µS/cm	11000	----	----	----	----
EA116: Temperature								
Temperature	----	0.1	°C	14.1	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	3010	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	3010	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<20	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	2040	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	230	----	----	----	----
Potassium	7440-09-7	1	mg/L	190	----	----	----	----
EG020T: Total Metals by ICP-MS								
Manganese	7439-96-5	0.001	mg/L	0.605	----	----	----	----
Iron	7439-89-6	0.05	mg/L	0.69	----	----	----	----
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	0.2	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	59.6	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.20	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	<0.20	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	<0.20	----	----	----	----
EP005: Total Organic Carbon (TOC)								



Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Client sample ID

				Leachate Storage Tank LP1	----	----	----	----
Client sampling date / time				17-Jun-2020 08:40	----	----	----	----
Compound	CAS Number	LOR	Unit	EW2002776-001	-----	-----	-----	-----
				Result	----	----	----	----
EP005: Total Organic Carbon (TOC) - Continued								
Total Organic Carbon	----	1	mg/L	309	----	----	----	----
EP025FD: Field Dissolved Oxygen								
Dissolved Oxygen	----	0.01	mg/L	7.43	----	----	----	----
Dissolved Oxygen - % Saturation	----	0.1	% saturation	73.1	----	----	----	----

CERTIFICATE OF ANALYSIS

Work Order : **EW2002773**
Client : **SHELLHARBOUR CITY COUNCIL**
Contact : Joel Coulton
Address : LAMERTON HOUSE, LAMERTON CRESCENT
 SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529

Telephone : ----
Project : Dunmore Quarterly Leachate
Order number : 126450
C-O-C number : ----
Sampler : ----
Site : DUNMORE LANDFILL TENDER
Quote number : WO/030/19 TENDER LEACHATE
No. of samples received : 1
No. of samples analysed : 1

Page : 1 of 4
Laboratory : Environmental Division NSW South Coast
Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500
 4/13 Geary Pl, North Nowra 2541
 Australia NSW Australia
Telephone : +61 2 4225 3125
Date Samples Received : 17-Jun-2020 15:10
Date Analysis Commenced : 17-Jun-2020
Issue Date : 24-Jun-2020 19:21



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

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<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ashesh Patel	Senior Chemist	Sydney Inorganics, Smithfield, NSW
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong, NSW
Hoa Nguyen	Senior Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW



General Comments

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

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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/EK058G: LOR raised for Nitrite and Nitrate 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 EA016 and EN67 PK.
- Dissolved oxygen (DO) performed by ALS Wollongong via in-house method EA025FD and EN67 PK.
- 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.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID			Leachate Sump	----	----	----	----
Client sampling date / time		17-Jun-2020 08:38			----	----	----	----	----
Compound	CAS Number	LOR	Unit	EW2002773-001	-----	-----	-----	-----	-----
				Result	----	----	----	----	----
EA005FD: Field pH									
pH	----	0.1	pH Unit	7.7	----	----	----	----	----
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	12000	----	----	----	----	----
EA116: Temperature									
Temperature	----	0.1	°C	15.3	----	----	----	----	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	3620	----	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	3620	----	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	104	----	----	----	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	1640	----	----	----	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	7	----	----	----	----	----
Potassium	7440-09-7	1	mg/L	12	----	----	----	----	----
EG020T: Total Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L	0.672	----	----	----	----	----
Iron	7439-89-6	0.05	mg/L	1.96	----	----	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.4	----	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	611	----	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.20	----	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<1.00	----	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<1.00	----	----	----	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	238	----	----	----	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Leachate Sump	----	----	----	----
Client sampling date / time				17-Jun-2020 08:38	----	----	----	----	
Compound	CAS Number	LOR	Unit	EW2002773-001	-----	-----	-----	-----	
				Result	----	----	----	----	
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L	0.35	----	----	----	----	
Dissolved Oxygen - % Saturation	----	0.1	% saturation	3.5	----	----	----	----	



CHAIN OF CUSTODY

ALS Laboratory: please tick →

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

Brisbane: 32 Shandi St, Stafford QLD 4053
Ph: 07 3243 7222 E: samples.brisbane@alsenviro.com

Melbourne: 2-4 Wesslall Rd, Springvale VIC 3171
Ph: 03 8549 9600 E: samples.melbourne@alsenviro.com

Perth: 10 Hod Way, Malaga WA 6090
Ph: 08 9209 7655 E: samples.perth@alsenviro.com

Newcastle: 5 Rosegem Rd, Warabrook NSW 2304
Ph: 02 4568 9433 E: samples.newcastle@alsenviro.com

Townsville: 14-15 Desma Ct, Bohle QLD 4818
Ph: 07 4796 0600 E: townsville.environmental@alsenviro.com

Adelaide: 2-1 Burma Rd, Pooraka SA 5095
Ph: 08 8359 5890 E: adelaide@alsenviro.com

Launceston: 27 Wellington St, Launceston TAS 7250
Ph: 03 8331 2158 E: launceston@alsenviro.com

CLIENT: Shellharbour City Council	TURNAROUND REQUIREMENTS: <input type="checkbox"/> Standard TAT (List due date): (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	FOR LABORATORY USE ONLY (Circle)								
OFFICE: 41 Burelli St WOLLONGONG NSW 2500	<input type="checkbox"/> Non Standard or urgent TAT (List due date):	Quality Seal intact? Yes No N/A	Free ice / frozen ice bricks present upon receipt? Yes No N/A							
PROJECT: Dunmore Quarterly Surface Waters	ALS QUOTE NO.: WO/030/19 TENDER	Random Sample Temperature on Receipt: °C								
ORDER NUMBER:	COC SEQUENCE NUMBER (Circle)	Other comment:								
PROJECT MANAGER: Joel Culton	COC: <table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr></table>	1	2	3	4	5	6	7		
1	2	3	4	5	6	7				
SAMPLER:	SAMPLER MOBILE:	RELINQUISHED BY: Aneta	RECEIVED BY: Arrian							
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	DATE/TIME: 17/6/20	DATE/TIME: 17/6/20							
Email Reports to :										
Email Invoice to :										

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

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) 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 (refer to codes below)	TOTAL BOTTLES	TSS	NT-1, NT-2 (Ionic Balance)	TOC & BOD	Dissolved and Total Fe	Turbidity	NH4 & NO3		Alkalinity
	SWP2		17/6/20 12:59	W			✓	✓		✓	✓			Field Tests - pH
	SWP4 - Sand Mine Dam		↓ 13:15	W			✓	✓	✓	✓	✓			Field Tests - pH
	SWP5		↓ 11:14	W			✓	✓	✓	✓	✓	DRY		Field Tests - pH
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 Ur V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation by Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

Environmental Division
Wollongong
Work Order Reference
EW2002774



Telephone: 02 42253125

CERTIFICATE OF ANALYSIS

Work Order : **EW2002774**
Client : **SHELLHARBOUR CITY COUNCIL**
Contact : Joel Coulton
Address : LAMERTON HOUSE, LAMERTON CRESCENT
 SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529

Telephone : ----
Project : Dunmore Quarterly Surface Water
Order number : 126450
C-O-C number : ----
Sampler : Glenn Davies, Robert DaLio
Site : DUNMORE LANDFILL TENDER
Quote number : WO/030/19 TENDER SURFACE WATER
No. of samples received : 3
No. of samples analysed : 3

Page : 1 of 3
Laboratory : Environmental Division NSW South Coast
Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500
 4/13 Geary Pl, North Nowra 2541
 Australia NSW Australia
Telephone : +61 2 4225 3125
Date Samples Received : 17-Jun-2020 15:00
Date Analysis Commenced : 17-Jun-2020
Issue Date : 24-Jun-2020 19:21



Accreditation No. 825
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<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Dian Dao		Sydney Inorganics, Smithfield, NSW
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong, NSW
Hoa Nguyen	Senior Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW



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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.**
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.6 Rivers and Streams.
- 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.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SWP2	SWP4 - Sand Mine Dam	SWP5	----	----
Client sampling date / time				17-Jun-2020 12:59	17-Jun-2020 13:15	17-Jun-2020 11:14	----	----	
Compound	CAS Number	LOR	Unit	EW2002774-001	EW2002774-002	EW2002774-003	-----	-----	
				Result	Result	Result	----	----	
EA005FD: Field pH									
pH	----	0.1	pH Unit	7.9	8.1	----	----	----	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	7	14	----	----	----	
EA045: Turbidity									
Turbidity	----	0.1	NTU	1.7	4.6	----	----	----	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	----	----	----	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	----	----	----	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	430	402	----	----	----	
Total Alkalinity as CaCO3	----	1	mg/L	430	402	----	----	----	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	180	260	----	----	----	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	351	441	----	----	----	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	87	58	----	----	----	
Magnesium	7439-95-4	1	mg/L	45	64	----	----	----	
Sodium	7440-23-5	1	mg/L	267	365	----	----	----	
Potassium	7440-09-7	1	mg/L	24	18	----	----	----	
EG020F: Dissolved Metals by ICP-MS									
Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	----	----	----	
EG020T: Total Metals by ICP-MS									
Iron	7439-89-6	0.05	mg/L	0.08	0.17	----	----	----	
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L	22.2	25.9	----	----	----	
∅ Total Cations	----	0.01	meq/L	20.3	24.5	----	----	----	
∅ Ionic Balance	----	0.01	%	4.63	2.75	----	----	----	
EN67 PK: Field Tests									
Field Observations	----	0.01	--	----	----	DRY	----	----	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	----	26	----	----	----	
EP030: Biochemical Oxygen Demand (BOD)									
Biochemical Oxygen Demand	----	2	mg/L	----	2	----	----	----	



CHAIN OF CUSTODY

ALS Laboratory: please tick →

□ Sydney: 277 Woodpark Rd, Smithfield NSW 2176
Ph: 02 8784 8655 E: samples.sydney@alsenviro.com
□ Newcastle: 5 Rosegum Rd, Warabrook NSW 2304
Ph: 02 4968 9433 E: samples.newcastle@alsenviro.com

□ Brisbane: 32 Stand St, Stafford QLD 4053
Ph: 07 3243 7222 E: samples.brisbane@alsenviro.com
□ Townsville: 14-15 Desma Ct, Behle QLD 4818
Ph: 07 4796 0600 E: townsville.environmental@alsenviro.com

□ Melbourne: 2-4 Westall Rd, Springvale VIC 3171
Ph: 03 8549 9600 E: samples.melbourne@alsenviro.com
□ Adelaide: 2-1 Burma Rd, Pooraka SA 5006
Ph: 08 8359 0890 E: adelaide@alsenviro.com

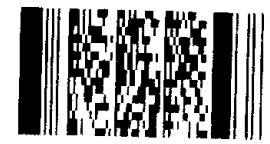
□ Perth: 10 Hol Way, Malaga WA 6060
Ph: 08 9209 7655 E: samples.perth@alsenviro.com
□ Launceston: 27 Wellington St, Launceston TAS 7250
Ph: 03 6331 2158 E: launceston@alsenviro.com

CLIENT: Shellharbour City Council	TURNAROUND REQUIREMENTS: <input type="checkbox"/> Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle) Custody Seal Intact? Yes No N/A Free Ice / frozen Ice blocks present upon receipt? Yes No N/A Random Sample Temperature on Receipt: C Other comment:							
OFFICE: 41 Burrell St WOLLONGONG NSW 2500	<input type="checkbox"/> Non Standard or urgent TAT (List due date):								
PROJECT: Dunmore Quarterly Surface Waters EPL	ALS QUOTE NO.: WO/030/19 TENDER								
ORDER NUMBER:	COC SEQUENCE NUMBER (Circle)								
PROJECT MANAGER: Joel Culton	COC: <table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr></table>	1	2	3	4	5	6	7	
1	2	3	4	5	6	7			
SAMPLER:	SAMPLER MOBILE:	OF: <table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr></table>	1	2	3	4	5	6	7
1	2	3	4	5	6	7			
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	RELINQUISHED BY: Aneta DATE/TIME: 17/6/20							
Email Reports to :		RECEIVED BY: Arrian DATE/TIME: 17/6/20							
Email Invoice to :		RELINQUISHED BY:							
		RECEIVED BY:							
COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:	CC reports to:								

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)				CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) 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 (refer to codes below)	TOTAL BOTTLES	TSS	NT-1, NT-2 (Ionic Balance)	TOC & BOD	Dissolved and Total Fe	Turbidity	NH4 & NO3		Alkalinity
	SWP1	17/6/20 13:22	W				✓	✓	✓	✓				Field Tests - pH
	SWC_2	11:30	W				✓		✓			✓	✓	Field Tests - pH & Temp
	SWC_UP	11:24	W				✓	✓	✓	✓	✓			Field Tests - pH & Temp
	SWC_DOWN	11:48	W				✓	✓	✓	✓	✓			Field Tests - pH & Temp
	SWC_DOWN_2	11:42	W				✓	✓	✓	✓	✓			Field Tests - pH & Temp
						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 F
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = S
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

Environmental Division
Wollongong
Work Order Reference
EW2002775



Telephone : 02 42263126

CERTIFICATE OF ANALYSIS

Work Order : **EW2002775**
Client : **SHELLHARBOUR CITY COUNCIL**
Contact : Joel Coulton
Address : LAMERTON HOUSE, LAMERTON CRESCENT
 SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529

Telephone : ----
Project : Dunmore Quarterly Surface Water EPL
Order number : 126450
C-O-C number : ----
Sampler : Glenn Davies, Robert DaLio
Site : DUNMORE LANDFILL TENDER
Quote number : WO/030/19 TENDER SURFACE WATER
No. of samples received : 5
No. of samples analysed : 5

Page : 1 of 4
Laboratory : Environmental Division NSW South Coast
Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500
 4/13 Geary Pl, North Nowra 2541
 Australia NSW Australia
Telephone : +61 2 4225 3125
Date Samples Received : 17-Jun-2020 15:03
Date Analysis Commenced : 17-Jun-2020
Issue Date : 26-Jun-2020 16:21



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Dian Dao		Sydney Inorganics, Smithfield, NSW
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong, NSW
Ivan Taylor	Analyst	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 Contact 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.**
- EG020: LOR's have been raised due to matrix interference. (High Total Dissolved Solids)
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.6 Rivers and Streams.
- 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.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SWP1 Point 1	SWC_2 Point 19	SWC_UP Point 20	SWC_Down Point 21	SWC_DOWN_2 Point 22
Client sampling date / time				17-Jun-2020 13:22	17-Jun-2020 11:30	17-Jun-2020 11:24	17-Jun-2020 11:48	17-Jun-2020 11:42	
Compound	CAS Number	LOR	Unit	EW2002775-001	EW2002775-002	EW2002775-003	EW2002775-004	EW2002775-005	
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit	7.0	7.2	7.0	7.4	7.3	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	20	11	18	6	10	
EA045: Turbidity									
Turbidity	----	0.1	NTU	3.1	----	1.9	1.6	1.3	
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	133	170	167	162	169	
Total Alkalinity as CaCO3	----	1	mg/L	133	170	167	162	169	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	----	2130	2280	2100	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	68	----	14100	14900	14200	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	30	----	337	356	337	
Magnesium	7439-95-4	1	mg/L	12	----	998	1060	978	
Sodium	7440-23-5	1	mg/L	38	----	8190	8890	8180	
Potassium	7440-09-7	1	mg/L	19	----	287	313	287	
EG020F: Dissolved Metals by ICP-MS									
Iron	7439-89-6	0.05	mg/L	1.31	<0.10	<0.10	<0.10	<0.10	
EG020T: Total Metals by ICP-MS									
Iron	7439-89-6	0.05	mg/L	2.13	0.24	0.19	<0.10	0.13	
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	14798-03-9_N	0.01	mg/L	----	1.68	0.34	0.72	0.28	
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	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	----	0.05	0.06	0.03	0.04	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	----	0.05	0.06	0.03	0.04	
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L	4.58	----	445	471	448	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SWP1 Point 1	SWC_2 Point 19	SWC_UP Point 20	SWC_Down Point 21	SWC_DOWN_2 Point 22
Client sampling date / time					17-Jun-2020 13:22	17-Jun-2020 11:30	17-Jun-2020 11:24	17-Jun-2020 11:48	17-Jun-2020 11:42
Compound	CAS Number	LOR	Unit		EW2002775-001	EW2002775-002	EW2002775-003	EW2002775-004	EW2002775-005
					Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued									
∅ Total Cations	----	0.01	meq/L		4.62	----	462	500	460
∅ Ionic Balance	----	0.01	%		0.52	----	1.88	2.96	1.41



CHAIN OF CUSTODY

ALS Laboratory: please tick →

□ Sydney: 277 Woodpark Rd, Smiffield NSW 2176
Ph: 02 8294 8665 E: samples.sydney@alsenviro.com

□ Brisbane: 32 Shand St, Stafford QLD 4053
Ph: 07 3243 7222 E: samples.brisbane@alsenviro.com

□ Melbourne: 2-4 Westall Rd, Springvale VIC 3171
Ph: 03 8549 6900 E: samples.melbourne@alsenviro.com

□ Perth: 10 Had Way, Malaga WA 6090
Ph: 08 9239 7655 E: samples.perth@alsenviro.com

□ Newcastle: 5 Rosegum Rd, Warabrook NSW 2304
Ph: 02 4568 0453 E: samples.newcastle@alsenviro.com

□ Townsville: 14-15 Dequina Ct, Bohle QLD 4816
Ph: 07 4796 0600 E: townsville.environmental@alsenviro.com

□ Adelaide: 2-1 Burns Rd, Pooraka SA 5095
Ph: 08 8359 0600 E: adelaide@alsenviro.com

□ Launceston: 27 Wallington St, Launceston TAS 7250
Ph: 03 6301 2159 E: launceston@alsenviro.com

CLIENT: Shellharbour City Council	TURNAROUND REQUIREMENTS: <input type="checkbox"/> Standard TAT (List due date): (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)		<input type="checkbox"/> Non Standard or urgent TAT (List due date):		FOR LABORATORY USE ONLY (Circle) Quality Seal intact? Yes No N/A Free ice / frozen samples present upon receipt? Yes No N/A Random Sample Temperature on Receipt: C Other comment:		
OFFICE: 41 Burelli St WOLLONGONG NSW 2500	ALS QUOTE NO.: WO030/19 TENDER	COC SEQUENCE NUMBER (Circle)					
PROJECT: Dunmore Quarterly Ground Waters EPL	ORDER NUMBER:	COC: 1 2 3 4 5 6 7					
PROJECT MANAGER: Joel Culton	SAMPLER:	RELINQUISHED BY: Robert			RECEIVED BY: Aneta		
SAMPLER MOBILE:	SAMPLER MOBILE:	DATE/TIME: 15.9.20 16:30			DATE/TIME: 15/9/20		
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	RELINQUISHED BY:			RECEIVED BY:		
Email Reports to :	EDD FORMAT (or default):	DATE/TIME:			DATE/TIME:		
Email Invoice to :	EDD FORMAT (or default):	DATE/TIME:			DATE/TIME:		
COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: CC reports to:							

ALS USE ONLY	SAMPLE DETAILS			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price)					Additional Information	
	LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	Ammonia	NT-2A (Alka, So4, Cl, F) Filtered Ca, K	TOC	Dissolved Fe & Mn		NT-4 (NO2, NO3)
	1	BH1C	15.9.20 11:00	W			✓	✓	✓	✓	✓	Field Tests - pH, EC, Temp & SWL
	2	BH3	13:52	W			✓	✓	✓	✓	✓	Field Tests - pH, EC, Temp & SWL
	3	BH4	14:48	W			✓	✓	✓	✓	✓	Field Tests - pH, EC, Temp & SWL
	4	BH9	10:45	W			✓	✓	✓	✓	✓	Field Tests - pH, EC, Temp & SWL
	5	BH12R	11:40	W			✓	✓	✓	✓	✓	Field Tests - pH, EC, Temp & SWL
	6	BH13	11:55	W			✓	✓	✓	✓	✓	Field Tests - pH, EC, Temp & SWL
	7	BH14	14:07	W			✓	✓	✓	✓	✓	Field Tests - pH, EC, Temp & SWL
	8	BH15	11:20	W			✓	✓	✓	✓	✓	Field Tests - pH, EC, Temp & SWL
	9	BH19R	13:40	W			✓	✓	✓	✓	✓	Field Tests - pH, EC, Temp & SWL
TOTAL						10						

Environmental Division
Wollongong
Work Order Reference
EW2004170



Telephone: 02 4222 2125

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 = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Sediment 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 : **EW2004170**
Client : **SHELLHARBOUR CITY COUNCIL**
Contact : Joel Coulton
Address : LAMERTON HOUSE, LAMERTON CRESCENT
 SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529

Telephone : ----
Project : Dunmore Quarterly Groundwaters EPL
Order number : 130985
C-O-C number : ----
Sampler : Robert DaLio
Site : DUNMORE LANDFILL TENDER
Quote number : WO/030/19 TENDER GROUNDWATERS
No. of samples received : 9
No. of samples analysed : 9

Page : 1 of 6
Laboratory : Environmental Division NSW South Coast
Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500
 4/13 Geary Pl, North Nowra 2541
 Australia NSW Australia
Telephone : +61 2 4225 3125
Date Samples Received : 15-Sep-2020 16:33
Date Analysis Commenced : 15-Sep-2020
Issue Date : 25-Sep-2020 15:08



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong, NSW
Ivan Taylor	Analyst	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 Contact 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
∅ = 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 1 due to sample matrix.
- 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.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH1C	BH3	BH4	BH9	BH12R
Client sampling date / time				15-Sep-2020 11:00	15-Sep-2020 13:52	15-Sep-2020 14:48	15-Sep-2020 10:45	15-Sep-2020 11:40	
Compound	CAS Number	LOR	Unit	EW2004170-001	EW2004170-002	EW2004170-003	EW2004170-004	EW2004170-005	
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit	7.1	7.0	6.9	7.0	6.7	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	7410	1350	2150	4550	2320	
EA116: Temperature									
Temperature	----	0.1	°C	25.3	19.1	19.5	20.1	21.4	
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	2250	310	674	1640	664	
Total Alkalinity as CaCO3	----	1	mg/L	2250	310	674	1640	664	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<10	100	173	159	200	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	1110	143	304	698	337	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	124	140	218	236	221	
Potassium	7440-09-7	1	mg/L	222	34	19	67	81	
EG020F: Dissolved Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L	0.115	0.040	0.241	0.795	0.459	
Iron	7439-89-6	0.05	mg/L	14.9	<0.05	5.54	8.80	4.34	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.3	0.1	0.1	0.4	0.2	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	344	10.5	9.04	77.3	4.11	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.06	0.03	0.03	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	27.4	<0.01	<0.01	0.75	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	27.5	0.03	0.03	0.75	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	214	15	23	77	31	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH1C	BH3	BH4	BH9	BH12R
Client sampling date / time				15-Sep-2020 11:00	15-Sep-2020 13:52	15-Sep-2020 14:48	15-Sep-2020 10:45	15-Sep-2020 11:40	
Compound	CAS Number	LOR	Unit	EW2004170-001	EW2004170-002	EW2004170-003	EW2004170-004	EW2004170-005	
				Result	Result	Result	Result	Result	
QWI-EN 67.11 Sampling of Groundwaters									
Standing Water Level	----	0.01	m AHD	2.96	3.01	4.21	2.92	4.15	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH13	BH14	BH15	BH19R	----
Client sampling date / time				15-Sep-2020 11:55	15-Sep-2020 14:07	15-Sep-2020 11:20	15-Sep-2020 13:40	----	----
Compound	CAS Number	LOR	Unit	EW2004170-006	EW2004170-007	EW2004170-008	EW2004170-009	-----	----
				Result	Result	Result	Result	----	----
EA005FD: Field pH									
pH	----	0.1	pH Unit	6.6	5.9	6.9	7.0	----	----
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	1070	1490	8700	1920	----	----
EA116: Temperature									
Temperature	----	0.1	°C	21.0	21.6	19.2	19.3	----	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	310	104	452	436	----	----
Total Alkalinity as CaCO3	----	1	mg/L	310	104	452	436	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	122	201	499	228	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	35	76	2690	311	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	148	108	167	156	----	----
Potassium	7440-09-7	1	mg/L	15	88	425	24	----	----
EG020F: Dissolved Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L	0.088	0.137	0.542	0.127	----	----
Iron	7439-89-6	0.05	mg/L	0.16	0.05	17.1	1.92	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.2	0.5	0.2	0.2	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.27	0.03	49.5	4.38	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	0.09	0.63	<0.01	0.04	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	28.1	86.3	<0.01	0.05	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	28.2	86.9	<0.01	0.09	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	10	48	117	26	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH13	BH14	BH15	BH19R	----
Client sampling date / time					15-Sep-2020 11:55	15-Sep-2020 14:07	15-Sep-2020 11:20	15-Sep-2020 13:40	----
Compound	CAS Number	LOR	Unit		EW2004170-006	EW2004170-007	EW2004170-008	EW2004170-009	-----
					Result	Result	Result	Result	----
QWI-EN 67.11 Sampling of Groundwaters									
Standing Water Level	----	0.01	m AHD		4.12	4.52	0.72	4.55	----

CERTIFICATE OF ANALYSIS

Work Order : **EW2004173**
Client : **SHELLHARBOUR CITY COUNCIL**
Contact : Joel Coulton
Address : LAMERTON HOUSE, LAMERTON CRESCENT
 SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529

Telephone : ----
Project : Dunmore Quarterly Leachate
Order number : 130985
C-O-C number : ----
Sampler : Robert DaLio
Site : DUNMORE LANDFILL TENDER
Quote number : WO/030/19 TENDER LEACHATE
No. of samples received : 1
No. of samples analysed : 1

Page : 1 of 4
Laboratory : Environmental Division NSW South Coast
Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500
 4/13 Geary Pl, North Nowra 2541
 Australia NSW Australia
Telephone : +61 2 4225 3125
Date Samples Received : 15-Sep-2020 16:37
Date Analysis Commenced : 15-Sep-2020
Issue Date : 22-Sep-2020 08:48



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

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This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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Signatories

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<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Robert DaLio	Sampler	Laboratory - Wollongong, NSW



General Comments

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

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^ = 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 due to sample matrix.
- EK057G: LOR raised for Nitrite 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.
- 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.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID			Leachate Sump	----	----	----	----
Client sampling date / time		15-Sep-2020 08:45			----	----	----	----	----
Compound	CAS Number	LOR	Unit	EW2004173-001	-----	-----	-----	-----	-----
				Result	----	----	----	----	----
EA005FD: Field pH									
pH	----	0.1	pH Unit	7.7	----	----	----	----	----
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	11200	----	----	----	----	----
EA116: Temperature									
Temperature	----	0.1	°C	18.0	----	----	----	----	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	3640	----	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	3640	----	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	250	----	----	----	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	1430	----	----	----	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	178	----	----	----	----	----
Potassium	7440-09-7	1	mg/L	258	----	----	----	----	----
EG020T: Total Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L	0.424	----	----	----	----	----
Iron	7439-89-6	0.05	mg/L	1.59	----	----	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.5	----	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	734	----	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.10	----	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.10	----	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.10	----	----	----	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	557	----	----	----	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Leachate Sump	----	----	----	----
Client sampling date / time				15-Sep-2020 08:45	----	----	----	----	
Compound	CAS Number	LOR	Unit	EW2004173-001	-----	-----	-----	-----	
				Result	----	----	----	----	
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L	0.13	----	----	----	----	
Dissolved Oxygen - % Saturation	----	0.1	% saturation	1.4	----	----	----	----	

CERTIFICATE OF ANALYSIS

Work Order : **EW2004172**
Client : **SHELLHARBOUR CITY COUNCIL**
Contact : Joel Coulton
Address : LAMERTON HOUSE, LAMERTON CRESCENT
 SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529

Telephone : ----
Project : Dunmore Quarterly Leachate Tank EPL
Order number : 130985
C-O-C number : ----
Sampler : Robert DaLio
Site : DUNMORE LANDFILL TENDER
Quote number : WO/030/19 TENDER LEACHATE
No. of samples received : 1
No. of samples analysed : 1

Page : 1 of 4
Laboratory : Environmental Division NSW South Coast
Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500
 4/13 Geary Pl, North Nowra 2541
 Australia NSW Australia
Telephone : +61 2 4225 3125
Date Samples Received : 15-Sep-2020 16:37
Date Analysis Commenced : 15-Sep-2020
Issue Date : 22-Sep-2020 08:47



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

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<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	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.**
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- EK057G: LOR raised for Nitrite 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.
- 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.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID			Leachate Storage Tank LP1	----	----	----	----
Client sampling date / time				15-Sep-2020 08:30	----	----	----	----	
Compound	CAS Number	LOR	Unit	EW2004172-001	-----	-----	-----	-----	
				Result	----	----	----	----	
EA005FD: Field pH									
pH	----	0.1	pH Unit	7.8	----	----	----	----	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	12200	----	----	----	----	
EA116: Temperature									
Temperature	----	0.1	°C	18.0	----	----	----	----	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	4420	----	----	----	----	
Total Alkalinity as CaCO3	----	1	mg/L	4420	----	----	----	----	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	252	----	----	----	----	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	1560	----	----	----	----	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	174	----	----	----	----	
Potassium	7440-09-7	1	mg/L	279	----	----	----	----	
EG020T: Total Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L	0.457	----	----	----	----	
Iron	7439-89-6	0.05	mg/L	1.29	----	----	----	----	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.5	----	----	----	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	887	----	----	----	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.10	----	----	----	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.10	----	----	----	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.10	----	----	----	----	
EP005: Total Organic Carbon (TOC)									



Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Client sample ID

				Leachate Storage Tank LP1	----	----	----	----
Client sampling date / time				15-Sep-2020 08:30	----	----	----	----
Compound	CAS Number	LOR	Unit	EW2004172-001	-----	-----	-----	-----
				Result	----	----	----	----
EP005: Total Organic Carbon (TOC) - Continued								
Total Organic Carbon	----	1	mg/L	577	----	----	----	----
EP025FD: Field Dissolved Oxygen								
Dissolved Oxygen	----	0.01	mg/L	0.06	----	----	----	----
Dissolved Oxygen - % Saturation	----	0.1	% saturation	0.6	----	----	----	----



CHAIN OF CUSTODY

ALS Laboratory: please tick →

Sydney: 277 Woodpark Rd, Smithfield NSW 2176
Ph: 02 8784 8555 E: samples_sydney@alsenviro.com

Newcastle: 5 Rosegum Rd, Warabrook NSW 2304
Ph: 02 4968 9433 E: samples_newcastle@alsenviro.com

Brisbane: 32 Shand St, Stafford QLD 4053
Ph: 07 3243 7222 E: samples_brisbane@alsenviro.com

Townsville: 14-15 Desma Ct, Bohle QLD 4818
Ph: 07 4796 0600 E: townsville_environmental@alsenviro.com

Melbourne: 2-4 Westall Rd, Springvale VIC 3171
Ph: 03 8549 9600 E: samples_melbourne@alsenviro.com

Adelaide: 2-1 Burma Rd, Pooraka SA 5065
Ph: 08 8359 0390 E: adelaide@alsenviro.com

Perth: 10 Hod Way, Malaga WA 6090
Ph: 08 9209 7655 E: samples_perth@alsenviro.com

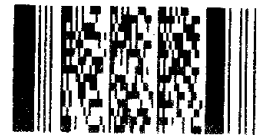
Launceston: 27 Wellington St, Launceston TAS 7250
Ph: 03 3331 2158 E: launceston@alsenviro.com

CLIENT: Shellharbour City Council		TURNAROUND REQUIREMENTS: <input type="checkbox"/> Standard TAT (List due date):		FOR LABORATORY USE ONLY (Circle)			
OFFICE: 41 Burali St WOLLONGONG NSW 2500		(Standard TAT may be longer for some tests e.g., Ultra Trace Organics)					
PROJECT: Dunmore Quarterly Surface Waters		ALS QUOTE NO.: WO/030/19 TENDER		Free Ice / Frozen Ice Bricks present upon receipt? Yes No NA			
ORDER NUMBER:				Random Sample Temperature on Receipt: °C			
PROJECT MANAGER: Joel Culton				Other comment:			
SAMPLER:		SAMPLER MOBILE:		COC SEQUENCE NUMBER (Circle)			
COC emailed to ALS? (YES / NO)		EDD FORMAT (or default):		COC: 1 2 3 4 5 6 7			
Email Reports to :				OF: 1 2 3 4 5 6 7			
Email Invoice to :				RELINQUISHED BY: Robert		RECEIVED BY: Aneta	
				DATE/TIME: 15.9.20 14:25		DATE/TIME: 15/9/20	
				RELINQUISHED BY:		RECEIVED BY:	
				DATE/TIME:		DATE/TIME:	

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

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) 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 (refer to codes below)	TOTAL BOTTLES	TSS	NT-1, NT-2 (Ionic Balance)	TOC & BOD	Dissolved and Total Fe	Turbidity	NH4 & NO3		Alkalinity
	SWP2		15.9.20 14:30	W			✓	✓		✓	✓			Field Tests - pH
	SWP4 - Sand Mine Dam		↓ 15:30	W			✓	✓	✓	✓	✓			Field Tests - pH
	SWP5		↓ 12:10	W			✓	✓	✓	✓	✓			Field Tests - pH
						TOTAL	10							

Environmental Division
Wollongong
Work Order Reference
EW2004174



Telephone: 02 42252126

Yield Preserved Glass:

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 - Air V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Sp 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 : **EW2004174**
Client : **SHELLHARBOUR CITY COUNCIL**
Contact : Joel Coulton
Address : LAMERTON HOUSE, LAMERTON CRESCENT
 SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529

Telephone : ----
Project : Dunmore Quarterly Surface Water
Order number : 130985
C-O-C number : ----
Sampler : Robert DaLio
Site : DUNMORE LANDFILL TENDER
Quote number : WO/030/19 TENDER SURFACE WATER
No. of samples received : 3
No. of samples analysed : 3

Page : 1 of 3
Laboratory : Environmental Division NSW South Coast
Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500
 4/13 Geary Pl, North Nowra 2541
 Australia NSW Australia
Telephone : +61 2 4225 3125
Date Samples Received : 15-Sep-2020 16:36
Date Analysis Commenced : 15-Sep-2020
Issue Date : 22-Sep-2020 15:05



Accreditation No. 825
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Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Robert DaLio	Sampler	Laboratory - Wollongong, NSW



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~ = Indicates an estimated value.

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- 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.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SWP2	SWP4 - Sand Mine Dam	SWP5	----	----
Client sampling date / time				15-Sep-2020 14:30	15-Sep-2020 15:30	15-Sep-2020 12:10	----	----	
Compound	CAS Number	LOR	Unit	EW2004174-001	EW2004174-002	EW2004174-003	-----	-----	
				Result	Result	Result	----	----	
EA005FD: Field pH									
pH	----	0.1	pH Unit	7.7	8.0	----	----	----	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	10	8	----	----	----	
EA045: Turbidity									
Turbidity	----	0.1	NTU	26.7	2.0	----	----	----	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	----	----	----	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	6	----	----	----	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	634	339	----	----	----	
Total Alkalinity as CaCO3	----	1	mg/L	634	345	----	----	----	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	280	275	----	----	----	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	438	441	----	----	----	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	143	54	----	----	----	
Magnesium	7439-95-4	1	mg/L	57	55	----	----	----	
Sodium	7440-23-5	1	mg/L	317	320	----	----	----	
Potassium	7440-09-7	1	mg/L	29	15	----	----	----	
EG020F: Dissolved Metals by ICP-MS									
Iron	7439-89-6	0.05	mg/L	0.20	<0.05	----	----	----	
EG020T: Total Metals by ICP-MS									
Iron	7439-89-6	0.05	mg/L	0.52	0.18	----	----	----	
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L	30.8	25.0	----	----	----	
∅ Total Cations	----	0.01	meq/L	26.4	21.5	----	----	----	
∅ Ionic Balance	----	0.01	%	7.86	7.59	----	----	----	
EN67 PK: Field Tests									
Field Observations	----	0.01	--	----	----	DRY	----	----	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	----	39	----	----	----	
EP030: Biochemical Oxygen Demand (BOD)									
Biochemical Oxygen Demand	----	2	mg/L	----	<2	----	----	----	

CERTIFICATE OF ANALYSIS

Work Order : **EW2004176**
Client : **SHELLHARBOUR CITY COUNCIL**
Contact : Joel Coulton
Address : LAMERTON HOUSE, LAMERTON CRESCENT
 SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529

Telephone : ----
Project : Dunmore Quarterly Surface Water EPL
Order number : 130985
C-O-C number : ----
Sampler : Robert DaLio
Site : DUNMORE LANDFILL TENDER
Quote number : WO/030/19 TENDER SURFACE WATER
No. of samples received : 5
No. of samples analysed : 5

Page : 1 of 4
Laboratory : Environmental Division NSW South Coast
Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500
 4/13 Geary Pl, North Nowra 2541
 Australia NSW Australia
Telephone : +61 2 4225 3125
Date Samples Received : 15-Sep-2020 16:34
Date Analysis Commenced : 15-Sep-2020
Issue Date : 22-Sep-2020 18:18



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	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 Contact 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.**
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.6 Rivers and Streams.
- 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.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SWP1 Point 1	SWC_2 Point 19	SWC_UP Point 20	SWC_Down Point 21	SWC_DOWN_2 Point 22
Client sampling date / time				15-Sep-2020 15:35	15-Sep-2020 12:35	15-Sep-2020 12:25	15-Sep-2020 13:00	15-Sep-2020 12:50	
Compound	CAS Number	LOR	Unit	EW2004176-001	EW2004176-002	EW2004176-003	EW2004176-004	EW2004176-005	
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit	7.2	7.5	7.2	7.4	7.5	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	12	8	18	15	12	
EA045: Turbidity									
Turbidity	----	0.1	NTU	1.2	----	3.3	3.2	4.3	
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	368	131	175	161	146	
Total Alkalinity as CaCO3	----	1	mg/L	368	131	175	161	146	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	240	----	1940	1670	838	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	357	----	12700	11200	6410	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	60	----	287	270	163	
Magnesium	7439-95-4	1	mg/L	49	----	726	674	366	
Sodium	7440-23-5	1	mg/L	282	----	6160	5690	3080	
Potassium	7440-09-7	1	mg/L	16	----	220	206	113	
EG020F: Dissolved Metals by ICP-MS									
Iron	7439-89-6	0.05	mg/L	0.40	0.10	0.11	0.07	0.08	
EG020T: Total Metals by ICP-MS									
Iron	7439-89-6	0.05	mg/L	2.30	0.49	0.40	0.33	0.35	
EK055G-NH4: Ammonium as N by DA									
Ammonium as N	14798-03-9_N	0.01	mg/L	----	0.77	0.60	0.57	0.38	
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	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	----	0.37	0.12	0.15	0.27	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	----	0.38	0.13	0.15	0.28	
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L	22.4	----	402	354	201	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SWP1 Point 1	SWC_2 Point 19	SWC_UP Point 20	SWC_Down Point 21	SWC_DOWN_2 Point 22
Client sampling date / time					15-Sep-2020 15:35	15-Sep-2020 12:35	15-Sep-2020 12:25	15-Sep-2020 13:00	15-Sep-2020 12:50
Compound	CAS Number	LOR	Unit		EW2004176-001	EW2004176-002	EW2004176-003	EW2004176-004	EW2004176-005
					Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued									
∅ Total Cations	----	0.01	meq/L		19.7	----	348	322	175
∅ Ionic Balance	----	0.01	%		6.45	----	7.27	4.77	6.93

Appendix C

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



CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ Sydney: 277 Woodpark Rd, Smithfield NSW 2176
Ph: 02 8764 8555 E: samples.sydney@alsenviro.com
☐ Newcastle: 5 Rosegum Rd, Warabrook NSW 2304
Ph: 02 4966 9433 E: samples.newcastle@alsenviro.com

☐ Brisbane: 32 Shand St, Stafford QLD 4053
Ph: 07 3243 7222 E: samples.brisbane@alsenviro.com
☐ Townsville: 14-15 Desma Ct, Bohle QLD 4818
Ph: 07 4796 9600 E: townsville.environmental@alsenviro.com

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

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

CLIENT: Shellharbour City Council	TURNAROUND REQUIREMENTS : <input type="checkbox"/> Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)								
OFFICE: Dunmore	(Standard TAT may be longer for some tests e.g., Ultra Trace Organics) <input type="checkbox"/> Non Standard or urgent TAT (List due date):									
PROJECT: Dunmore Dust	ALS QUOTE NO.: WO/030/19 TENDER	COC SEQUENCE NUMBER (Circle)								
ORDER NUMBER:		COC: <table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr></table>	1	2	3	4	5	6	7	Custody Seal Intact? Yes No N/A Free ice / frozen ice bricks present upon receipt? Yes No N/A Random Sample Temperature on Receipt: C Other comment:
1	2	3	4	5	6	7				
PROJECT MANAGER: Joel Culton		OF: <table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr></table>	1	2	3	4	5	6	7	
1	2	3	4	5	6	7				
SAMPLER:	SAMPLER MOBILE:	RELINQUISHED BY: Anefe	RECEIVED BY: Arrican							
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	DATE/TIME: 16/1/20	DATE/TIME: 16/1/20							
Email Reports to :										
Email Invoice to :										

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

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) 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 (refer to codes below)	TOTAL BOTTLES	A04 (Ash, CM, TIS)								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	DDG1	11/12/19 - 16/1/20	AIR			✓								
2	DDG2	↓	AIR			✓								
3	DDG3		AIR			✓								
4	DDG4		AIR				✓							
					TOTAL	10								

Environmental Division
Wollongong
Work Order Reference
EW2000231



Telephone : 02 42253126

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
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl 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 : **EW2000231**
Client : **SHELLHARBOUR CITY COUNCIL**
Contact : Joel Coulton
Address : LAMERTON HOUSE, LAMERTON CRESCENT
 SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529

Telephone : ----
Project : Dunmore Landfill Dust
Order number : 126450
C-O-C number : ----
Sampler : Glenn Davies
Site : DUNMORE LANDFILL TENDER
Quote number : WO/030/19 TENDER DUST
No. of samples received : 4
No. of samples analysed : 4

Page : 1 of 2
Laboratory : Environmental Division NSW South Coast
Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500
 4/13 Geary Pl, North Nowra 2541
 Australia NSW Australia
Telephone : +61 2 4225 3125
Date Samples Received : 16-Jan-2020 15:57
Date Analysis Commenced : 20-Jan-2020
Issue Date : 04-Feb-2020 09:31



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Alison Graham	Supervisor - Inorganic	Newcastle - Inorganics, Mayfield West, NSW



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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 Contact 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.

- Sample exposure period is 36 days which is outside the typical exposure period of 30 +/- 2 days as per AS3580.10.1.
- 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/m².mth.

Analytical Results

Sub-Matrix: **DEPOSITIONAL DUST**
 (Matrix: **AIR**)

Client sample ID

				DDG1	DDG2	DDG3	DDG4	----
				11/12/19 - 16/01/20	11/12/19 - 16/01/20	11/12/19 - 16/01/20	11/12/19 - 16/01/20	----
Client sampling date / time				16-Jan-2020 14:15	16-Jan-2020 14:00	16-Jan-2020 14:10	16-Jan-2020 14:22	----
Compound	CAS Number	LOR	Unit	EW2000231-001	EW2000231-002	EW2000231-003	EW2000231-004	-----
				Result	Result	Result	Result	----
EA120: Ash Content								
Ash Content	----	0.1	g/m ² .month	5.6	3.9	6.2	3.6	----
Ash Content (mg)	----	1	mg	119	82	132	77	----
EA125: Combustible Matter								
Combustible Matter	----	0.1	g/m ² .month	1.8	0.8	1.5	0.8	----
Combustible Matter (mg)	----	1	mg	37	18	32	17	----
EA141: Total Insoluble Matter								
Total Insoluble Matter	----	0.1	g/m ² .month	7.4	4.7	7.7	4.4	----
Total Insoluble Matter (mg)	----	1	mg	156	100	164	94	----



CHAIN OF CUSTODY

ALS Laboratory: please tick →

Sydney: 277 Woodpark Rd, Smithfield NSW 2176
Ph: 02 8784 8555 E:samples.sydney@alsenviro.com
 Newcastle: 5 Rosegum Rd, Warabrook NSW 2304
Ph:02 4968 9433 E:samples.newcastle@alsenviro.com

Brisbane: 32 Shand St, Stafford QLD 4053
Ph:07 3243 7222 E:samples.brisbane@alsenviro.com
 Townsville: 14-15 Desma Ct, Bohle QLD 4818
Ph:07 4756 0600 E:townsville.environmental@alsenviro.com

Melbourne: 2-4 Westall Rd, Springvale VIC 3171
Ph:03 8549 5600 E:samples.melbourne@alsenviro.com
 Adelaide: 2-1 Burma Rd, Pooraka SA 5096
Ph: 08 8359 0800 E:adelaide@alsenviro.com

Perth: 10 Hori Way, Malaga WA 6060
Ph: 08 9209 7655 E:samples.perth@alsenviro.com
 Launceston: 27 Wellington St, Launceston TAS 7250
Ph: 03 6331 2158 E:launceston@alsenviro.com

CLIENT: Shellharbour City Council	TURNAROUND REQUIREMENTS : <input type="checkbox"/> Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle) Dubby Seal Inscr? Yes No N/A Free ice / frozen ice bricks present upon receipt? Yes No N/A Random Sample Temperature on Receipt: C Other comment:							
OFFICE: Dunmore	(Standard TAT may be longer for some tests e.g., Ultra Trace Organics) <input type="checkbox"/> Non Standard or urgent TAT (List due date):								
PROJECT: Dunmore Dust	ALS QUOTE NO.: WO/030/19 TENDER								
ORDER NUMBER:	COC SEQUENCE NUMBER (Circle)								
PROJECT MANAGER: Joel Culton	COC: <table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr></table>	1	2	3	4	5	6	7	
1	2	3	4	5	6	7			
	OF: <table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr></table>	1	2	3	4	5	6	7	
1	2	3	4	5	6	7			
SAMPLER:	SAMPLER MOBILE:	RELINQUISHED BY:							
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	RECEIVED BY:							
Email Reports to :		DATE/TIME:							
Email Invoice to :		DATE/TIME:							

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

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) 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 (refer to codes below)	TOTAL BOTTLES	A04 (Ash, CM, TIS)								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
	DDG1	10-3-20 11:00	AIR			✓								
	DDG2	11:10	AIR			✓								
	DDG3	10:54	AIR			✓								
	DDG4	11:30	AIR			✓								
					TOTAL	10								

Environmental Division
Wollongong
Work Order Reference
EW2001273



Telephone : 02 42253125

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

3/2012

CERTIFICATE OF ANALYSIS

Work Order : **EW2001273**
Client : **SHELLHARBOUR CITY COUNCIL**
Contact : Joel Coulton
Address : LAMERTON HOUSE, LAMERTON CRESCENT
 SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529

Telephone : ----
Project : Dunmore Landfill Dust
Order number : 126450
C-O-C number : ----
Sampler : ----
Site : DUNMORE LANDFILL TENDER
Quote number : WO/030/19 TENDER DUST
No. of samples received : 4
No. of samples analysed : 4

Page : 1 of 2
Laboratory : Environmental Division NSW South Coast
Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500
 4/13 Geary Pl, North Nowra 2541
 Australia NSW Australia
Telephone : +61 2 4225 3125
Date Samples Received : 09-Mar-2020 16:18
Date Analysis Commenced : 13-Mar-2020
Issue Date : 18-Mar-2020 16:31



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

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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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Jennifer Targett	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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 Contact 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 is not held for results reported in g/m².mth.

Analytical Results

Sub-Matrix: **DEPOSITIONAL DUST**
 (Matrix: AIR)

Client sample ID

				DDG1 11/02/2020 - 10/03/2020	DDG2 11/02/2020 - 10/03/2020	DDG3 11/02/2020 - 10/03/2020	DDG4 11/02/2020 - 10/03/2020	----
Client sampling date / time				10-Mar-2020 11:00	10-Mar-2020 11:10	10-Mar-2020 10:54	10-Mar-2020 11:30	----
Compound	CAS Number	LOR	Unit	EW2001273-001	EW2001273-002	EW2001273-003	EW2001273-004	-----
				Result	Result	Result	Result	----
EA120: Ash Content								
Ash Content	----	0.1	g/m ² .month	0.7	0.4	0.6	1.3	----
Ash Content (mg)	----	1	mg	12	7	10	21	----
EA125: Combustible Matter								
Combustible Matter	----	0.1	g/m ² .month	0.5	0.3	1.2	0.6	----
Combustible Matter (mg)	----	1	mg	8	5	20	10	----
EA141: Total Insoluble Matter								
Total Insoluble Matter	----	0.1	g/m ² .month	1.2	0.7	1.8	1.9	----
Total Insoluble Matter (mg)	----	1	mg	20	12	30	31	----



CHAIN OF CUSTODY

ALS Laboratory: please tick →

Sydney: 277 Woodpark Rd, Smithfield NSW 2176
Ph: 02 8784 8555 E: samples.sydney@alsenviro.com
 Newcastle: 5 Rosegum Rd Warabrook NSW 2304
Ph: 02 4968 9433 E: samples.newcastle@alsenviro.com

Brisbane: 32 Shand St, Stafford QLD 4053
Ph: 07 3243 7222 E: samples.brisbane@alsenviro.com
 Townsville: 14-15 Desma Ct, Bohle QLD 4818
Ph: 07 4796 0600 E: townsville.environmental@alsenviro.com

Melbourne: 2-4 Wustall Rd, Springvale VIC 3171
Ph: 03 8549 9600 E: samples.melbourne@alsenviro.com
 Adelaide: 2-1 Burne Rd, Proraka SA 5095
Ph: 08 8359 0390 E: adelaide@alsenviro.com

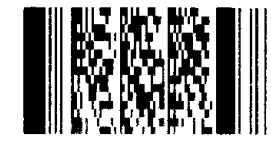
Perth: 10 Hod Way, Malaga WA 6060
Ph: 08 9269 7655 E: samples.perth@alsenviro.com
 Launceston: 27 Wellington St, Launceston TAS 7250
Ph: 03 6331 2188 E: launceston@alsenviro.com

CLIENT: Shellharbour City Council	TURNAROUND REQUIREMENTS: <input type="checkbox"/> Standard TAT (List due date): (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	FOR LABORATORY USE ONLY (Circle)	
OFFICE: Dunmore	<input type="checkbox"/> Non Standard or urgent TAT (List due date):	Custody Seal intact?	Yes No N/A
PROJECT: Dunmore Dust	ALS QUOTE NO.: WO/030/19 TENDER	Free/cs / frozen ice bricks present upon receipt?	Yes No N/A
ORDER NUMBER:	COC SEQUENCE NUMBER (Circle)	Random Sample Temperature on Receipt	C
PROJECT MANAGER: Joel Culton	COC: 1 2 3 4 5 6 7	Other comment:	
SAMPLER:	SAMPLER MOBILE:	RELINQUISHED BY:	RECEIVED BY:
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	Aneta	Arman
Email Reports to:		DATE/TIME: 17/6/20	DATE/TIME: 17/6/20
Email Invoice to:			

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

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) 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 (refer to codes below)	TOTAL BOTTLES	A04 (Ash, CM, TIS)							Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
	DDG1	17/6/20 9:27	AIR			✓							
	DDG2	9:20	AIR			✓							
	DDG3	12:53	AIR			✓							
	DDG4	8:18	AIR			✓							
					TOTAL	10							

Environmental Division
Wollongong
Work Order Reference
EW2002772



Telephone: 02 42253124

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
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl 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 : **EW2002772**
Client : **SHELLHARBOUR CITY COUNCIL**
Contact : Joel Coulton
Address : LAMERTON HOUSE, LAMERTON CRESCENT
 SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529

Telephone : ----
Project : Dunmore Landfill Dust
Order number : 126450
C-O-C number : ----
Sampler : Glenn Davies, Robert DaLio
Site : DUNMORE LANDFILL TENDER
Quote number : WO/030/19 TENDER DUST
No. of samples received : 4
No. of samples analysed : 4

Page : 1 of 2
Laboratory : Environmental Division NSW South Coast
Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500
 4/13 Geary Pl, North Nowra 2541
 Australia NSW Australia
Telephone : +61 2 4225 3125
Date Samples Received : 17-Jun-2020 15:04
Date Analysis Commenced : 19-Jun-2020
Issue Date : 25-Jun-2020 11:26



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Joel Mullarvey	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 Contact 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.
- Sample exposure period is 33 days which is outside the typical exposure period of 30 +/- 2 days as per AS3580.10.1.
- 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/m².mth.

Analytical Results

Sub-Matrix: DEPOSITIONAL DUST
 (Matrix: AIR)

Client sample ID

				DDG1 15/05/2020 - 17/06/2020	DDG2 15/05/2020 - 17/06/2020	DDG3 15/05/2020 - 17/06/2020	DDG4 15/05/2020 - 17/06/2020	----
Client sampling date / time				17-Jun-2020 09:27	17-Jun-2020 09:20	17-Jun-2020 12:53	17-Jun-2020 08:18	----
Compound	CAS Number	LOR	Unit	EW2002772-001	EW2002772-002	EW2002772-003	EW2002772-004	-----
				Result	Result	Result	Result	----
EA120: Ash Content								
Ash Content	----	0.1	g/m ² .month	0.3	0.3	0.4	1.6	----
Ash Content (mg)	----	1	mg	6	5	8	32	----
EA125: Combustible Matter								
Combustible Matter	----	0.1	g/m ² .month	0.3	0.1	0.4	0.8	----
Combustible Matter (mg)	----	1	mg	5	3	8	15	----
EA141: Total Insoluble Matter								
Total Insoluble Matter	----	0.1	g/m ² .month	0.6	0.4	0.8	2.4	----
Total Insoluble Matter (mg)	----	1	mg	11	8	16	47	----



CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ Sydney: 277 Woodpark Rd. Smithfield NSW 2176
Ph: 02 8784 8565 E: samples.sydney@alsenviro.com
☐ Newcastle: 5 Rosegum Rd. Warabrook NSW 2304
Ph: 02 4968 9433 E: samples.newcastle@alsenviro.com

☐ Brisbane: 32 Shand St. Stafford QLD 4053
Ph: 07 3243 7222 E: samples.brisbane@alsenviro.com
☐ Townsville: 14-15 Desma Ct. Bohle QLD 4818
Ph: 07 4796 0600 E: townsville.environmental@alsenviro.com

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

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

CLIENT: Shellharbour City Council	TURNAROUND REQUIREMENTS: <input type="checkbox"/> Standard TAT (List due date): (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	FOR LABORATORY USE ONLY (Circle) Custody Seal Intact? Yes No N/A Free ice / frozen ice bricks present upon receipt? Yes No N/A Random Sample Temperature on Receipt: °C Other comment:
OFFICE: Dunmore	<input type="checkbox"/> Non Standard or urgent TAT (List due date):	
PROJECT: Dunmore Dust	ALS QUOTE NO.: WO/030/19 TENDER	
ORDER NUMBER:	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7	
PROJECT MANAGER: Joel Culton	SAMPLER: SAMPLER MOBILE:	RECEIVED BY: <i>Aneta</i> DATE/TIME: 15/9/20
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	RELINQUISHED BY: <i>Robert</i> DATE/TIME: 15.9.20 16:30
Email Reports to :		RECEIVED BY:
Email Invoice to :		DATE/TIME:
COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: CC reports to:		

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) 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 (refer to codes below)	TOTAL BOTTLES	A04 (Ash, CM, TIS)							Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
	DDG1	15/9/20 9:28	AIR			✓							
	DDG2	9:50	AIR			✓							
	DDG3	14:21	AIR			✓							
	DDG4	7:35	AIR			✓							
TOTAL					10								

Environmental Division
Wollongong
Work Order Reference
EW2004177



Telephone: 02 42253125

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
 V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl 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 : **EW2004177**
Client : **SHELLHARBOUR CITY COUNCIL**
Contact : Joel Coulton
Address : LAMERTON HOUSE, LAMERTON CRESCENT
 SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529

Telephone : ----
Project : Dunmore Landfill Dust
Order number : 130985
C-O-C number : ----
Sampler : Robert DaLio
Site : DUNMORE LANDFILL TENDER
Quote number : WO/030/19 TENDER DUST
No. of samples received : 4
No. of samples analysed : 4

Page : 1 of 2
Laboratory : Environmental Division NSW South Coast
Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500
 4/13 Geary Pl, North Nowra 2541
 Australia NSW Australia
Telephone : +61 2 4225 3125
Date Samples Received : 15-Sep-2020 16:31
Date Analysis Commenced : 17-Sep-2020
Issue Date : 24-Sep-2020 13:37



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
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 Contact 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 is not held for results reported in g/m².mth.

Analytical Results

Sub-Matrix: DEPOSITIONAL DUST
 (Matrix: AIR)

Client sample ID

				DDG1 14/08/2020 - 15/09/2020	DDG2 14/08/2020 - 15/09/2020	DDG3 14/08/2020 - 15/09/2020	DDG4 14/08/2020 - 15/09/2020	----
Client sampling date / time				15-Sep-2020 09:28	15-Sep-2020 09:50	15-Sep-2020 14:21	15-Sep-2020 07:35	----
Compound	CAS Number	LOR	Unit	EW2004177-001	EW2004177-002	EW2004177-003	EW2004177-004	-----
				Result	Result	Result	Result	----
EA120: Ash Content								
Ash Content	----	0.1	g/m ² .month	0.2	0.2	0.6	1.9	----
Ash Content (mg)	----	1	mg	3	3	12	36	----
EA125: Combustible Matter								
Combustible Matter	----	0.1	g/m ² .month	<0.1	<0.1	0.5	0.8	----
Combustible Matter (mg)	----	1	mg	1	1	8	14	----
EA141: Total Insoluble Matter								
Total Insoluble Matter	----	0.1	g/m ² .month	0.2	0.2	1.1	2.7	----
Total Insoluble Matter (mg)	----	1	mg	4	4	20	50	----

Appendix D

Surface Gas (Methane) Field Sheets

ALS Landfill Emissions Report



Client: Shellharbour City Council Date: 11/12/2019
 Site: Dunmore Sampler(s): Glenn Davies, Aneta Prosaroski

Transact / Location	Point	GPS North	GPS East	CH4 Conc (ppm)	Comments
A	1	6168 375	302 461	1.8	
A	2	6168 344	302 464	1.6	
A	3	6168 331	302 463	8.6	
A	4	6168 310	302 458	2.1	
A	5	6168 289	302 455	1.7	
A	6	6168 266	302 453	2.2	
A	7	6168 242	302 450	1.9	
A	8	6168 221	302 440	1.8	
B	1	6168 059	302 419	1.6	
B	2	6168 084	302 420	2.1	
B	3	6168 117	302 423	2.1	
B	4	6168 138	302 423	2.1	
B	5	6168 164	302 430	1.7	
B	6	6168 188	302 431	1.5	
B	7	6168 210	302 437	1.4	
B	8	6168 230	302 431	1.2	
B	9	6168 271	302 434	2.1	
B	10	6168 323	302 443	1.8	
B	11	6168 346	302 443	1.5	
C	1	6168 338	302 393	1.5	
C	2	6168 314	302 401	1.6	
C	3	6168 277	302 408	1.5	
C	4	6168 256	302 413	1.5	
C	5	6168 235	302 414	1.7	
C	6	6168 213	302 414	1.4	
C	7	6168 190	302 414	1.2	
C	8	6168 169	302 410	1.1	
C	9	6168 146	302 406	1.1	
C	10	6168 127	302 404	0.9	
C	11	6168 103	302 401	1.4	
C	12	6168 081	302 398	1.2	
C	13	6168 059	302 396	1.4	
D	1	6168 058	302 376	1.6	
D	2	6168 081	302 373	1.7	
D	3	6168 101	302 369	1.8	
D	4	6168 127	302 367	2.0	
D	5	6168 165	302 374	1.7	
D	6	6168 180	302 365	1.5	
D	7	6168 199	302 364	1.7	
D	8	6168 226	302 370	1.3	
D	9	6168 246	302 373	1.5	
E	1	6168 249	302 347	1.4	
E	2	6168 229	302 344	1.4	
E	3	6168 207	302 342	1.6	
E	4	6168 185	302 344	1.4	
E	5	6168 167	302 343	1.5	
E	6	6168 144	302 346	1.5	
E	7	6168 122	302 355	1.6	
E	8	6168 103	302 361	1.6	
E	9	6168 073	302 365	1.8	
E	10	6168 057	302 366	1.8	
F	1	6168 154	302 315	1.7	
F	2	6168 180	302 214	1.4	
F	3	6168 203	302 213	1.5	
F	4	6168 225	302 304	1.4	
F	5	6168 239	302 300	1.5	
F	6	6168 253	302 297	1.2	
Site Offices				3.2	
Landfill Weighbridge (General public)				3.1	
Revolve Centre				3.8	
Resalable area				1.2	
Landfill Weighbridge (Tip Face)				1.2	
Methane Blank (Pre testing)				1.3	Taken at entrance to Dunmore site before main gate
Methane Blank (Post testing)				1.2	Taken at entrance to Dunmore site before main gate
Comments:					
Sampling performed in accordance to EPA Environmental Guidelines Solid Waste Landfills, Second Edition, 2016 Gas concentrations are reported as raw values without correction for background concentration.					



CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ Sydney: 277 Woodpark Rd. Smithfield NSW 2179
Ph: 02 8784 8533 E: samples.sydney@alsenviro.com
☐ Newcastle: 5 Rosegum Rd. Warabrook NSW 2304
Ph: 02 4962 9433 E: samples.newcastle@alsenviro.com

☐ Brisbane: 32 Shand St, Stafford QLD 4055
Ph: 07 3243 7222 E: samples.brisbane@alsenviro.com
☐ Townsville: 14-15 Desma Ct, Bonle QLD 4818
Ph: 07 4746 0000 E: townsville.environmental@alsenviro.com

☐ Melbourne: 2-4 Westall Rd. Springvale VIC 3171
Ph: 03 8510 9600 E: samples.melbourne@alsenviro.com
☐ Adelaide: 2-1 Burma Rd. Pooraka SA 5095
Ph: 08 9350 0800 E: adelaide@alsenviro.com


☐ Perth: 10 Hod Way, Melaga WA 8200
Ph: 08 9209 7655 E: samples.perth@alsenviro.com
☐ Launceston: 27 Wellington St. Launceston TAS 7250
Ph: 03 6331 2158 E: launceston@alsenviro.com

CLIENT: Shellharbour City Council	TURNAROUND REQUIREMENTS: <input type="checkbox"/> Standard TAT (List due date): (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)		<input type="checkbox"/> Non Standard or urgent TAT (List due date):		FOR LABORATORY USE ONLY (Circle) Quality Seal Intact? Yes No N/A Fries Ice / Frozen Co. Checks present upon receipt? Yes No N/A Random Sample Temperature on Receipt: °C Other comment:
OFFICE: 41 Burrell St WOLLONGONG NSW 2500	ALS QUOTE NO.: WO/030/19 TENDER	COC SEQUENCE NUMBER (Circle)			
PROJECT: Dunmore Quarterly Methane Testing		COC: 1 2 3 4 5 6 7			
ORDER NUMBER:		OP: 1 2 3 4 5 6 7			
PROJECT MANAGER: Joel Culton	SAMPLER:	SAMPLER MOBILE:	RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):		Glenn DATE/TIME: 10/3/20	Aneta DATE/TIME: 10/3/20	
Email Reports to :					
Email Invoice to :					

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

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) 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 (refer to codes below)	TOTAL BOTTLES	Surface Methane Testing								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
	Methane	10/3/20	W			✓	✓							
					TOTAL	10								

Environmental Division
Wollongong
Work Order Reference
EW2001459



Telephone: 02 42253125

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
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl 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.

ALS Landfill Emissions Report



Client: Shellharbour City Council
Site: Dunmore

Date: 10/03/2020
Sampler(s): Glenn Davies, Aneta Prosaroski

Transact / Location	Point	GPS North	GPS East	CH4 Conc (ppm)	Comments
A	1	6168 326	302 461	2.4	
A	2	6168 309	302 457	3.0	
A	3	6168 3291	302 455	2.5	
A	4	6168 268	302 445	2.4	
A	5	6168 250	302 453	3.5	
A	6	6168 232	302 448	3.9	
A	7	6168 217	302 441	2.9	
A	8	6168 196	302 434	2.5	
B	1	6168 328	302 455	2.5	
B	2	6168 311	302 465	2.3	
B	3	6168 289	302 438	2.2	
B	4	6168 272	302 439	2.3	
B	5	6168 259	302 439	2.4	
B	6	6168 249	302 439	2.8	
B	7	6168 234	302 438	3.7	
B	8	6168 222	302 435	6.0	
B	9	6168 206	302 433	2.6	
B	10	6168 195	302 432	2.6	
C	1	6168 25	302 392	2.7	
C	2	6168 52	302 399	3.0	
C	3	6168 94	302 404	2.5	
C	4	6168 124	302 409	2.4	
C	5	6168 176	302 415	2.3	
C	6	6168 209	302 417	2.1	
C	7	6168 257	302 413	2.1	
C	8	6168 302	302 406	2.1	
C	9	6168 355	302 391	2.2	
C	10	6168 408	302 376	2.2	
C	11	6168 422	302 371	2.3	
C	12	6168 440	302 367	2.3	
C	13	6168 469	302 371	2.4	
D	1	6168 232	302 389	2.4	
D	2	6168 217	302 385	2.5	
D	3	6168 195	302 384	2.5	
D	4	6168 163	302 392	2.8	
D	5	6168 128	302 395	2.5	
D	6	6168 110	302 391	2.4	
D	7	6168 100	302 392	2.4	
D	8	6168 086	302 391	2.3	
D	9	6168 063	302 384	2.2	
E	1	6168 066	302 380	2.0	
E	2	6168 076	302 379	2.1	
E	3	6168 083	302 380	2.2	
E	4	6168 092	302 379	2.4	
E	5	6168 102	302 377	2.4	
E	6	6168 125	302 368	2.2	
E	7	6168 144	302 355	2.6	
E	8	6168 177	302 339	2.6	
E	9	6168 200	302 335	3.8	
E	10	6168 225	302 331	2.6	
F	1	6168 098	302 361	1.7	
F	2	6168 117	302 357	1.4	
F	3	6168 149	302 343	1.5	
F	4	6168 177	302 327	1.4	
F	5	6168 200	302 317	1.5	
F	6	6168 218	302 314	1.2	
G	2	6168 459	302 352	2.1	
G	3	6168 438	302 320	2.2	
G	4	6168 415	302 285	2.2	
G	5	6168 406	302 252	2.3	

H	1	6168 162	302 408	2.2	
H	2	6168 109	302 355	2.3	
H	3	6168 056	302 320	2.4	
H	4	6168 019	302 289	2.5	
H	5	6168 430	302 257	2.6	
H	6	6168 398	302 225	2.7	
H	7	6168 344	302 173	2.6	
H	8	6168 310	302 140	2.5	
H	9	6168 274	302 106	2.4	
H	10	6168 231	302 078	2.5	
H	11	6168 162	302 72	2.8	
H	12	6168 109	302 70	2.9	
H	13	6168 056	302 62	2.4	
H	14	6168 019	302 119	9.0	
H	15	6167 989	302 151	12.0	
H	16	6167 954	302 181	8.0	
H	17	6167 925	302 209	3.0	
H	18	6167 901	302 233	2.6	
H	19	6167 875	302 272	2.4	
H	20	6167 872	302 318	2.5	
H	21	6167 877	302 367	2.7	
H	22	6167 886	302 412	3.6	
H	23	6167 899	302 464	5.6	
H	24	6168 482	302 521	2.2	
H	25	6168 415	302 555	2.2	
H	26	6168 331	302 547	2.2	
H	27	6168 292	302 541	2.2	New Weighbridge
H	28	6168 250	302 490	2.2	
H	29	6168 220	302 561	2.2	
H	30	6168 200	302 576	2.2	
H	31	6168 168	302 596	2.2	
H	32	6168 142	302 614	2.2	
H	33	6168 110	302 635	2.2	
H	34	6168 090	302 642	2.3	Organic Garden Waste
H	35	6168 071	302 601	2.0	
H	36	6168 088	302 581	2.0	
H	37	6168 114	302 565	2.0	
H	38	6168 150	302 542	2.1	
I	1	6168 125	302 101	3.6	
I	2	6168 130	302 143	3.5	
I	3	6168 130	302 194	3.9	
I	4	6168 127	302 253	3.1	
J	1	6168 146	302 267	2.8	
J	2	6168 189	302 255	2.4	
J	3	6168 239	302 237	2.6	
J	4	6168 292	302 218	2.4	
J	5	6168 284	302 199	2.5	
K	1	6168 516	302 362	2.2	
K	2	6168 529	302 390	2.2	
K	3	6168 541	302 424	2.3	
K	4	6168 554	302 464	2.3	
K	5	6168 588	302 446	2.3	
L	1	6168 587	302 410	2.3	
L	2	6168 572	302 375	2.3	
L	3	6168 563	302 427	2.2	
L	4	6168 551	302 390	2.3	
L	5	6168 545	302 376	2.3	
L	6	6168 532	302 349	2.2	
Compressor Shed	1	6167 950	302 185	3.7	
Site Offices	1	6168 197	302 567	2.2	
Revolve Centre	1	6168 474	302472	2.2	
Truckwash Building	1			2.3	
Landfill Weighbridge (Tip Face)	1	6168 488	302 421	2.6	
Landfill Weighbridge (Tip Face) - Toilet	1			20.7	
Methane Blank (Pre testing)				2.0	Taken at entrance to Dunmore site before main gate
Methane Blank (Post testing)				1.9	Taken at entrance to Dunmore site before main gate
Comments:					
Sampling performed in accordance to EPA Environmental Guidelines Solid Waste Landfills, Second Edition, 2016 Gas concentrations are reported as raw values without correction for background concentration.					

ALS Landfill Emissions Report

Client: Shellharbour City Council Date: 11/06/2020
 Site: Dunmore Sampler(s) Glenn Davies, Arrian Zautsen

Transact / Location	Point	GPS North	GPS East	CH4 Conc (ppm)	Comments
A	1	6168 216	302 446	4.0	
A	2	6168 230	302 447	2.8	
A	3	6168 245	302 452	2.8	
A	4	6168 262	302 455	4.6	
A	5	6168 284	302 457	4.3	
A	6	6168 300	302 456	2.1	
A	7	6168 316	302 458	2.0	
A	8	6168 333	302 460	1.6	
B	1	6168 333	302 437	1.6	
B	2	6168 318	302 437	1.4	
B	3	6168 300	302 439	2.5	
B	4	6168 282	302 440	2.8	
B	5	6168 265	302 440	2.2	
B	6	6168 244	302 440	3.6	Methane Cage
B	7	6168 224	302 437	3.2	
B	8	6168 204	302 434	2.8	
B	9	6168 176	302 434	2.3	
B	10	6168 156	302 432	2.0	
C	1	6168 415	302 383	3.2	
C	2	6168 353	302 400	2.9	
C	3	6168 292	302 414	2.5	
C	4	6168 220	302 423	2.5	
C	5	6168 196	302 424	3.3	
C	6	6168 165	302 421	4.2	
C	7	6168 132	302 417	6.8	
C	8	6168 086	302 411	7.0	
C	9	6168 054	302 408	6.1	
D	1	6168 152	302 325	3.1	
D	2	6168 173	302 315	3.1	Methane Cage
D	3	6168 195	302 314	3.5	
D	4	6168 218	302 310	3.4	
D	5	6168 231	302 307	3.7	
D	6	6168 247	302 305	3.6	
D	7	6168 262	302 304	2.7	
E	1	6168 259	302 321	1.9	
E	2	6168 239	302 330	1.8	
E	3	6168 204	302 335	2.3	
E	4	6168 170	302 338	2.7	
E	5	6168 132	302 356	2.0	
E	6	6168 113	302 360	2.5	Methane Cage
E	7	6168 079	302 366	2.5	
E	8	6168 060	302 372	2.2	
E	9	6168 258	302 389	2.1	
E	10	6168 376	302 298	1.9	
F	1	6168 062	302 382	2.4	
F	2	6168 075	302 387	2.6	
F	3	6168 129	302 391	2.2	
F	4	6168 173	302 395	2.0	
F	5	6168 216	302 387	1.9	
F	6	6168 237	302 389	2.2	
F	7	6168 276	302 386	2.1	

G	1	6168 447	302 359	1.5	
G	2	6168 427	302 324	1.7	
G	3	6168 408	302 290	2.4	
G	4	6168 406	302 260	1.5	
H	1	6168 218	302 534	2.0	
H	2	6168 183	302 582	1.9	
H	3	6168 147	302 603	1.8	
H	4	6168 115	302 622	3.1	
H	5	6168 080	302 616	4.9	
H	6	6168 085	302 579	4.0	
H	7	6168 113	302 563	3.4	
H	8	6168 168	302 528	2.4	
H	9	6168 029	302 504	2.1	
H	10	6168 954	302 498	3.5	
H	11	6168 885	302 433	1.6	
H	12	6168 873	302 376	1.7	
H	13	6168 868	302 335	2.1	
H	14	6168 869	302 284	4.2	
I	1	6168 125	302 247	4.8	
I	2	6168 124	302 206	4.1	
I	3	6168 111	302 149	2.3	
I	4	6168 110	302 096	2.0	
J	1	6168 355	302 200	1.9	
J	2	6168 302	302 218	2.0	
J	3	6168 269	302 230	4.0	
J	4	6168 201	302 254	3.8	
J	5	6168 153	302 268	14.3	
K	1	6168 524	302 384	1.8	
K	2	6168 540	302 418	1.7	
K	3	6168 548	302 448	2.7	
K	4	6168 564	302 425	2.0	
K	5	6168 557	302 401	2.7	
L	1	6168 743	302 336	2.3	
L	2	6168 700	302 305	2.2	
L	3	6168 664	302 255	2.1	
L	4	6168 623	302 237	2.1	
L	5	6168 587	302 215	2.0	
L	6	6168 549	302 178	2.1	
Compressor Shed	1			1.9	
Office	1			1.8	
Community Recycling Centre	1			2.4	
OLD Weighbridge				2.5	
OLD Weighbridge Toilet				2.5	
Revolve Shop				1.8	
Building Truckwash	1			1.9	
New Weighbridge	1			2.3	
Methane Blank (Pre testing)				1.9	Taken at entrance to Dunmore site before main gate
Methane Blank (Post testing)				2.2	Taken at entrance to Dunmore site before main gate
Comments:					
Sampling performed in accordance to EPA Environmental Guidelines Solid Waste Landfills, Second Edition, 2016 Gas concentrations are reported as raw values without correction for background concentration.					

ALS Landfill Emissions Report



Client: Shellharbour City Council Date: 8/09/2020
 Site: Dunmore Sampler(s) Robert DeLo, Arrian Zautsen

Transact / Location	Point	GPS North	GPS East	CH4 Conc (ppm)	Comments
A	1	6168 185	302 337	2.1	
A	2	6168 160	302 355	3.6	
A	3	6168 126	302 348	2.1	
A	4	6168 106	302 350	2.0	
A	5	6168 085	302 347	2.0	
A	6	6168 050	302 234	2.0	
B	1	6168 101	302 337	2.2	
B	2	6168 070	302 335	3.3	
B	3	6168 051	302 336	2.5	
B	4	6168 027	302 331	2.2	
B	5	6167 799	302 331	2.2	
B	6	6167 975	302 325	2.5	
B	7	6168 930	302 321	2.0	
B	8	6168 890	302 318	2.0	
B	9	6168 838	302 315	2.0	
C	1	6168 263	302 267	2.0	
C	2	6168 206	302 281	2.5	
C	3	6168 132	302 301	2.2	
C	4	6168 641	302 317	3.0	
C	5	6167 997	302 318	2.8	
C	6	6167 950	302 313	2.2	
C	7	6167 898	302 307	2.3	
C	8	6167 863	302 290	2.3	
D	1	6167 939	302 270	1.9	
D	2	6167 967	302 274	1.8	
D	3	6167 991	302 260	1.9	
D	4	6168 022	302 277	1.9	
D	5	6168 048	302 275	1.9	
D	6	6168 067	302 277	1.9	
D	7	6168 087	302 283	2.0	
D	8	6168 172	302 245	3.0	
D	9	6168 227	302 200	2.0	

E	1	6168 155	302 221	2.5	
E	2	6168 175	302 201	2.2	
E	3	6168 213	302 180	2.0	
E	4	6168 067	302 227	1.8	
E	5	6168 048	302 229	1.9	
E	6	6168 033	302 231	1.9	
E	7	6168 011	302 237	1.9	
E	8	6167 968	302 245	1.9	
F	1	6167 869	302 257	1.8	
F	2	6167 901	302 257	1.8	Methane Case
F	3	6167 932	302 249	1.9	
F	4	6167 959	302 227	1.9	
F	5	6167 980	302 214	1.9	Methane Case
F	6	6168 005	302 209	1.9	
F	7	6168 034	302 208	1.9	
F	8	6168 061	302 200	1.9	
G	1	6168 213	302 149	2.0	
G	2	6168 225	302 182	2.0	
G	3	6168 250	302 209	2.0	
G	4	6168 273	302 247	2.0	
H	1	6168 147	302 057	1.9	
H	2	6168 124	302 037	1.9	
H	3	6168 083	302 001	1.9	
H	4	6168 012	302 968	1.9	
H	5	6167 973	301 968	1.9	
H	6	6167 900	301 969	1.9	
H	7	6167 783	301 023	2.0	
H	8	6167 750	302 088	4.2	
H	9	6167 703	302 137	4.0	
H	10	6167 691	302 315	2.7	
H	11	6168 291	302 300	2.2	
H	12	6168 232	302 292	2.1	
H	13	6168 265	302 186	2.0	
H	14	6168 223	302 146	2.0	
H	15	6167 743	302 387	2.1	
H	16	6167 795	302 394	2.2	
H	17	6167 868	302 402	2.1	
H	18	6167 930	302 408	2.1	
H	19	6168 984	302 414	2.1	
H	20	6168 100	302 430	2.1	
H	21	6168 310	302 359	2.1	

I	1	6167 934	302 215	1.9	
I	2	6167 927	302 210	1.9	
I	3	6167 923	302 056	1.9	
I	4	6167 916	302 011	1.9	
J	1	6168 169	302 092	1.9	
J	2	6168 120	302 107	1.9	
J	3	6168 077	302 124	1.9	
J	4	6168 021	302 143	2.0	
J	5	6168 958	302 164	2.0	
K	1	6168 377	302 324	2.5	
K	2	6168 367	302 301	2.4	
K	3	6168 358	302 273	2.4	
K	4	6168 370	302 268	2.3	
K	5	6168 392	302 385	2.3	
K	6	6168 406	302 324	2.3	
K	7	6168 378	302 359	2.3	
K	8	6168 341	302 350	2.3	
K	9	6168 335	302 300	2.3	
L	1	6168 522	302 202	1.9	
L	2	6168 485	302 178	1.9	
L	3	6168 457	302 146	1.9	
L	4	6168 841	302 129	2.0	
L	5	6168 838	302 102	2.0	
L	6	6168 367	302 078	2.0	
L	7	6168 339	302 059	2.0	
L	8	6168 306	302 037	2.0	
L	9	6168 265	302 001	2.0	
L	10	6168 240	301 963	2.0	
Compressor Shed	1			12.5	
Office	1			2.5	
Community Recycling Centre	1			2.5	
OLD Weighbridge				2.3	
OLD Weighbridge Toilet				2.2	
Revolve Shop				2.1	
Building Truckwash	1			2.3	
New Weighbridge	1			2.3	
Methane Blank (Pre testing)				2.4	Taken at entrance to Dunmore site before main gate
Methane Blank (Post testing)				2.3	Taken at entrance to Dunmore site before main gate
Comments:					
Sampling performed in accordance to EPA Environmental Guidelines Solid Waste Landfills, Second Edition, 2016 Gas concentrations are reported as raw values without correction for background concentration.					

Appendix E

Laboratory Chain of Custody (COC) & Certificates of Analysis (COA) – Overflow Event

CERTIFICATE OF ANALYSIS

Work Order : **EW2003592**
Client : **SHELLHARBOUR CITY COUNCIL**
Contact : Joel Coulton
Address : LAMERTON HOUSE, LAMERTON CRESCENT
 SHELL HARBOUR CITY CENTRE NSW, AUSTRALIA 2529

Telephone : ----
Project : Dunmore Landfill Overflows
Order number : 130985
C-O-C number : ----
Sampler : ----
Site : ----
Quote number : WO/030/19 TENDER OVERFLOW DISCHARGE
No. of samples received : 2
No. of samples analysed : 2

Page : 1 of 2
Laboratory : Environmental Division NSW South Coast
Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500
 4/13 Geary Pl, North Nowra 2541
 Australia NSW Australia
Telephone : +61 2 4225 3125
Date Samples Received : 10-Aug-2020 15:05
Date Analysis Commenced : 10-Aug-2020
Issue Date : 17-Aug-2020 13:33



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Glenn Davies	Environmental Services Representative	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 Contact 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.
- pH performed by ALS Wollongong via in-house method EA005FD 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

Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Client sample ID

				SWP1 Point 1	SWP2 Point 1	----	----	----
Client sampling date / time				10-Aug-2020 13:45	10-Aug-2020 13:55	----	----	----
Compound	CAS Number	LOR	Unit	EW2003592-001 Result	EW2003592-002 Result	-----	-----	-----
EA005FD: Field pH								
pH	----	0.1	pH Unit	7.2	7.2	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	<5	----	----	----

Appendix F

Calibration Certificates



EQUIPMENT SHEET / CALIBRATION CERTIFICATE

Instrument: Inspectra Laser (ATEX)
Serial No: 5700418

Equipment Information	Enclosed	Comment
Inspectra Laser ATEX Instrument Manual	<input checked="" type="checkbox"/>	
AC Charger Cable (Australian)	<input checked="" type="checkbox"/>	
ATEX Charger	<input checked="" type="checkbox"/>	
12VDC Vehicle Charger	<input checked="" type="checkbox"/>	
Sample Handle	<input checked="" type="checkbox"/>	
Sampling Probe	<input checked="" type="checkbox"/>	
Telescoping Wand	<input checked="" type="checkbox"/>	
C10 Regulator + Tubing	<input type="checkbox"/>	
3mm Hex Driver (Red)	<input type="checkbox"/>	
Inspectra Spanner Wrench Hydrophobic	<input type="checkbox"/>	
Filters x 5	<input type="checkbox"/>	
Cotton Filters x 20	<input type="checkbox"/>	
Dust Filters (Yellow) x 5	<input type="checkbox"/>	
Harness Straps	<input checked="" type="checkbox"/>	
Yellow Gazomat Carry Case	<input checked="" type="checkbox"/>	

Calibration Results		
Parameter	Standard	Result
CH4	10ppm	10ppm

This is to certify that where possible, this instrument has been calibrated in accordance with the manufacturer's calibration procedure. ECO Standard Rental Terms and Conditions apply to all equipment calibrations.

Regards,

Jeremy Kil

Equipment Specialist
 Eco Environmental Holdings

03-Dec-2019

CERTIFICATION OF CALIBRATION



Issued by: QED Environmental Systems Ltd.

Calibration certificate number 19248 H-01690

Instrument Laser One Serial number 19248

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 (ppm)	Gas concentration (ppm)	Response 1 (ppm)	Response 2 (ppm)	Response 3 (ppm)	Average response (ppm)	Maximum error (ppm)	Maximum error (% F.s.)	Maximum error %
1000	2.5	2.6	2.5	2.5	2.53	0.10	0.01	0.01
1000	3.2	3	3.2	3.2	3.13	0.20	0.02	0.02
1000	10.3	10.7	10.7	10.7	10.70	0.40	0.04	0.04
1000	107	101	101	101	101.00	6.00	0.60	0.60
1000	1000	1005	1005	1005	1005.00	5.00	0.50	0.50
Uncertainty						0.60		%
Max % error						0.60		% FS

Gas verification from 0-100% vol CH4

Full scale (%vol)	Gas concentration (%vol)	Response 1 (%vol)	Response 2 (%vol)	Response 3 (%vol)	Average response (%vol)	Maximum error (%vol)	Maximum error (% F.s.)	Maximum error %
10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10.00	1.00	1.00	1.00	1.00	1.00	1.00	10.00	10.00
10.00	2.20	2.20	2.20	2.20	2.20	0.00	0.00	0.00
10.00	5.00	5.00	5.00	5.00	5.00	0.00	0.00	0.00
100.00	15.00	15.00	15.10	15.10	15.07	0.10	0.10	0.10
100.00	50.00	50.00	50.00	50.00	50.00	0.00	0.00	0.00
100.00	100.00	100.00	100.00	100.00	100.00	0.00	0.00	0.00
Uncertainty						10.00		%
Max % error						10.00		% FS

Gas verification from 0-100% CH4 LEL (0-4.4% VOL)

Full scale (%vol)	Gas concentration (LEL%)	Response 1 (LEL%)	Response 2 (LEL%)	Response 3 (LEL%)	Average response (%vol)	Maximum error (LEL%)	Maximum error (% F.s.)	Maximum error %
10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10.00	2.00	2.01	2.01	2.01	2.01	0.01	0.10	0.10
100.00	50.00	50.00	50.00	50.00	50.00	0.00	0.00	0.00
Uncertainty						0.10		%
Max % error						0.10		% 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

Registered in England and Wales 1898734

CERTIFICATION OF CALIBRATION



Issued by: QED Environmental Systems Ltd.

Environmental conditions during calibration

Temperature	21.4	C
Pressure	1004	mBar

Gas bottles used for calibration

Gas	Cylinder number	Expiry date	Gas
Synthetic Air	S1624403EE	19/05/2023	Synthetic Air
3 ppm	1431235G	11/04/2024	CH4
10 ppm	1140315G	11/04/2024	CH4
100 ppm	S1100861	10/04/2024	CH4
1000 ppm	S1100299S	10/04/2024	CH4
1.0 vol	S1198415S	10/04/2024	CH4

Calibration results **Pass**

Next scheduled calibration

25/11/2020

Calibration date 25/11/2019

Calibration done by Laura McBride

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

Registered in England and Wales 1898734

Page 2 of 2

Date: 9.9.19

Attn: Meelan Liew
Air-Met Scientific Pty. Ltd.
7-11 Ceylon Street
Nunawading
Vic. 3131

O/N 721424

Calibration Verification Certificate # 5042

Manufacture/Model : Gazomat Inspectra Laser CH4 analyser
S/N : 3810912
Gases Monitored : CH4, 0-100%

		Specification +/-10%
Gas used N2 BOC High Purity reads	: 0.0ppm	
Gas used Calgaz 50ppm CH4 in Air reads	: 50.2ppm	(45-55ppm) Conforms
Gas used Calgaz 500ppm CH4 in Air reads	: 502ppm	(450-550ppm) Conforms
Gas used Calgaz 1.0% CH4 in Air reads	: 10280ppm (1.0%)	(0.9-1.1%) Conforms
Gas used Calgaz 2.5% CH4 in Air reads	: 2.6%	(2.25-2.75%) Conforms
Gas used Linde 99.9% CH4 reads	: 103.0%	(90-110%) Conforms

Comments : Calibration OK

Next Service/calibration Due : 9.9.20

Stephen Hurst
ANRI Instruments & Controls Pty Ltd