

Global Resource Recovery

Annual Monitoring Report EPL 229-01

29 June 2021 – 28 June 2022

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Glossary

ANZECC	Australian and New Zealand Environment & Conservation Council
ARMCANZ	Agriculture & Resource Management Council of Australia & New Zealand
CSM	Conceptual Site Model
DHWQO	Darwin Harbour Water Quality Objectives
EMP	Environmental Management Plan
EPL	Environmental Protection Licence
GWMP	Groundwater Monitoring Program
GRR	Global Resource Recovery
GMP	Groundwater Management Plan
IBC	Intermediate Bulk Container
LWTF	The Darwin Liquid Waste Treatment Facility
NT EPA	Northern Territory Environmental Protection Authority
NATA	National Accredited Testing Authority
PFAS	Isolation of Per- and polyfluoroalkyl substance
SWMP	Surface Water Monitoring Plan
TOR	Terms of Reference

Section 1 Introduction

The Darwin Liquid Waste Treatment Facility (LWTF) is located within East Arm Industrial Precinct, Northern Territory (Figure 1). The facility is owned by Smorgon Fuels Pty Ltd, trading as Global Resource Recovery (GRR) and licenced by the Northern Territory Environment Protection Authority (NT EPA) under the Waste Management and Pollution Control Act and the Water Act.

The facility receives liquid wastes, including listed wastes as defined in the Act, from maritime, mining and oil and gas industries in the Darwin Region. Wastes that cannot be treated onsite are consolidated and transported to suitable local or interstate licensed facilities.

The facility and regulatory obligations are managed under a few administrative documents but primarily the Environment Protection Licence (EPL) 229-01 (Appendix A), and Smorgon Fuels (Global Resource Recovery) Darwin Liquid Waste Treatment Facility Environmental Management Plan (Global Resource Recovery, October 2021).

An environmental monitoring program is administered by GRR. The environmental program includes the monitoring of groundwater, surface waters and air emissions.

Conditions 62 and 63 of the Licence requires GRR to provide an annual monitoring report. The annual monitoring report must be provided to the NT EPA within ten (10) days after the anniversary of the date of the licence. This report includes the environmental monitoring results in relation to the Licence for the period between 29 June 2021 and 28 June 2022 (herein referred to as the reporting period).

As per the requirements of Condition 63 of the Licence, this report:

- is prepared in accordance with the requirements of the NT EPA 'Guideline for Reporting on Environmental Monitoring';
- reports on surface water, groundwater, stormwater transferred from bunded areas and stack emission monitoring undertaken for this licence and as part of the environmental monitoring program for the site;
- includes a tabulation of all monitoring data required as a condition of this licence. Data must be provided electronically in Microsoft Excel format;
- includes long term trend analysis of monitoring data to demonstrate any environmental impact associated with the activity over a minimum period of three years (where the data is available). Data used in this analysis must be provided electronically in Microsoft Excel format;
- provides an assessment on groundwater levels, including groundwater contours and tidal influence;
- reports on all exceedances and investigations undertaken for this licence; and
- includes an assessment of environmental impact from the activity.

1.1 NT EPA Licence

The Licence commenced on 29 June 2020 and will expire on 28 June 2022. The boundary of the Licence is shown in Figure 1 and Figure 2. The licence is available on the NT EPA website at <https://ntepa.nt.gov.au/your-business/public-registers/licences-and-approvals-register/environment-protection-licences/listed-waste-handlers/smorgen-fuels-pty-ltd>.



Figure 1 Darwin Liquid Waste Treatment Facility Location



Figure 2 Darwin Liquid Waste Treatment Facility Close-up

1.2 GRR Environmental Monitoring

Several aspects of the operation of the GRR facility may impact upon the environment. Licence requires that GRR undertake environmental monitoring of these aspects and the environmental receptors that may be impacted. These are outlined in the GRR facility environmental management plan (EMP) and include:

- Discharges to water, including:
 - Stormwater discharge
 - Bund water discharge
- Discharges to air, including:
 - Stack emission monitoring;
- Discharges to land and surrounding environment, including:
 - Groundwater monitoring.

GRR has developed and implements several routine monitoring programs to meet the requirements of the Licence. The objectives, methods and results of these monitoring programs have been included in the relevant sections of this report.

The environmental monitoring was carried out in general accordance with:

- Australian and New Zealand Guidelines for Water Quality: Sampling, AS/NZS 5667.1, 1998.
- National Environment Protection Council (NEPC) National Environment Protection (Assessment of Site Contamination) Measure (NEPM), 1999, as amended in 2013 (ASC NEPM).
- National Environment Protection Council (NEPC) National Environment Protection (Air Toxics) Measure (NEPM), 1999, as amended in 2013 (ASC NEPM).
- NT EPA, 2018. Guideline for Reporting on Environmental Monitoring, (May 2016).

1.3 Site context

1.3.1 Climate

The climate of Darwin is characterised by a tropical monsoonal climate with a distinct Dry Season (May to September) and Wet Season (October to April). The Dry Season is dominated by dry, cool weather with little rain, low humidity and wide-ranging temperatures. The onset and duration of the Wet Season varies between years, however most rainfall in the Northern Territory is associated with monsoonal troughs and/or from isolated convective storms (BoM 2022). High precipitation rates are commonly experienced during storm events in the wet season.

The Darwin Airport Bureau of Meteorology station is located approximately 7.5 km northwest of the Project area. The average annual rainfall for Darwin is 1,731.2 mm. Most of the annual rainfall occurs between November and March. The mean minimum temperature is 23.2°C and the mean maximum temperature is 32.1°C (BoM 2022) (Appendix B).

Synoptic winds during the dry season tend to be dominated by the southeast trade winds, while light west to north-westerlies predominate during the wet season. Sea breezes from the northwest occur on most afternoons throughout the year.

Tropical cyclones occur in the Darwin region on average about once per year.

1.3.2 Storm Surge and High Tide Inundation

The site is located above the highest tides and the Palmerston Area Storm Surge Inundation mapping shows that the site is above the flood level estimate until year 2100.

Section 2 Groundwater Monitoring

In accordance with EPL requirements, the Groundwater Monitoring Events (GMEs) are undertaken as per EPL229-01 Attachment B which outlines the groundwater monitoring scope and analytical program. The purpose of the GMEs is to measure standing water level (SWL) and collect groundwater samples for laboratory analysis from the two existing on site monitoring bores and three off site monitoring bores. The bore locations are presented in Figure 3.

The GMEs during this annual reporting period were undertaken on the following dates:

- 28 July 2021 – Monthly
- 25 August 2021 – Monthly
- 23 September 2021 – Quarterly
- 20 October 2021 – Monthly
- 30 November 2021 – Monthly
- 17 December 2021 – Quarterly
- 21 January 2022 – Monthly
- 23 February 2022 – Monthly
- 25 March 2022 – Annual
- 13 April 2022 – Monthly
- 25 May 2022 - Monthly

Specific details on the methodologies implemented for each GME are described within the individual monitoring reports attached as Appendix C. A summary of the typical groundwater sampling programme and testing schedule is described in Table 2-1.

Table 2-1 Groundwater sampling programme 2021-2022

Sample Round	Environmental Monitoring Bores	Analysis
Monthly	EMB 7 EMB 12 EMB 15	Standing Water Levels
	EMB 13 EMB 14	Standing Water Levels In-situ parameters (pH, temp, ORP, EC, TDS, DO)
Quarterly	EMB 7 EMB 12 EMB 15	Standing Water Levels

Section 2 Groundwater Monitoring

Sample Round	Environmental Monitoring Bores	Analysis
	EMB 13 EMB 14	Standing Water Levels In-situ parameters (pH, temp, ORP, EC, TDS, DO) Nutrients (NH ₃ , NO _x , TKN, TN, TP) Major Anions (Alkalinity, Sulfate, Chloride, total) Major Cations (Ca, Mg, K, Na total) Dissolved Metals (Sb, As, Ba, Be, Bo, Cd, Cr, Cu, Co, Cu, Pb, Mn, Mo, Ni, Se, Ag, Sn, V, Zn, Hg) Total Recoverable Hydrocarbons BTEXN Polycyclic Aromatic Hydrocarbons PFAS Phenolic Compounds Glycols
Annual	EMB 7 EMB 12 EMB 15 EMB 13 EMB 14	Standing Water Levels In-situ parameters (pH, temp, ORP, EC, TDS, DO) Nutrients (NH ₃ , NO _x , TKN, TN, TP) Major Anions (Alkalinity, Sulfate, Chloride, total) Major Cations (Ca, Mg, K, Na total) Dissolved Metals (Sb, As, Ba, Be, Bo, Cd, Cr, Cu, Co, Cu, Pb, Mn, Mo, Ni, Se, Ag, Sn, V, Zn, Hg) Total Recoverable Hydrocarbons BTEXN Polycyclic Aromatic Hydrocarbons PFAS Phenolic Compounds Glycols



Figure 3 Darwin Liquid Waste Treatment Facility Groundwater Bore Location

2.1 Groundwater Sampling Methodology

All groundwater sampling events were conducted by Greencap and sampled using an industry standard low flow groundwater sampling techniques with dedicated tubing and in accordance with AS/NZS 5667.1:1998, AS/NZS 5667.11:1998 and <https://www.waterquality.gov.au/anz-guidelines>. The flow rate was monitored and regulated using an interface probe to maintain a stable water level during purging and sampling of groundwater.

The following methodology was applied:

- Measuring standing water levels (SWL) from the surveyed point at the top of the casings using water/product interface water level meter prior to sampling.
- Monitoring physio-chemical parameters (pH, temperature, dissolved oxygen, electrical conductivity, salinity, total dissolved solids, turbidity and oxidation-reduction potential) during purging using a calibrated water quality meter. Sampling occurred when the drawdown and these parameters had stabilised within the ranges presented in NT Department of Mines and Energy Methodology for the Sampling of Ground Waters (2009).
- The sampler wore a clean pair of disposable nitrile gloves when collecting each sample.
- All groundwater samples collected in appropriate bottles/containers provided by analytical laboratories and placed in a chilled esky for transportation immediately after collection.
- Field observations were recorded during sampling including aesthetic evidence of contamination such as sheen, colour and odour.
- Collection of appropriate quality assurance/quality control (QA/QC) samples including intra- and interlaboratory duplicates and rinsate and trip blanks.

The field records, laboratory data and calibration records of groundwater sampling events undertaken by Greencap are provided in Appendix C.

2.2 Groundwater Assessment Criteria

There are no specific assessment criteria outlines in EPL 229-012 for Groundwater. EPL229-01 Attachment B outlines the parameters to be analysed and the frequency of analysis for each bore.

2.3 Quality Assurance/Quality Control

Quality Assurance / Quality Control (QA/QC) measures for this investigation were based on AS4482.1–2005 and included:

- Appropriate sample labelling, preservation, storage and transport under chain of custody procedures.
- Laboratory analyses conducted within appropriate holding times.
- Analysis of laboratory QA/QC samples including duplicates, blanks, matrix spikes, matrix spike duplicates, and surrogates.
- The use of laboratories that hold NATA accreditation for the analyses undertaken. The laboratories used for the analyses were Eurofins and ALS. The laboratories are approved by the National Association of Testing Authorities (NATA), and the analyses conducted are within the NATA registration of the laboratories.
- Collection and analysis of field QA/QC samples including duplicates and blanks.

The QA/QC controls are considered adequate as per the relevant standards and guidelines.

2.3.1 Internal Laboratory QA/QC

The results of the internal quality assurance programs of the laboratory are presented with the NATA test certificates (Appendix C). Appropriate internal laboratory QA/QC was reported by both laboratories.

2.4 Groundwater Monitoring Results

2.4.1 Field parameters

The methodologies described in Section 2.1 were implemented during each of the GMEs during this annual reporting period. Bore conditions were recorded and are presented within each monitoring report. Generally, the bore network is of acceptable condition.

While gauging the standing water level (SWL) in each of the suitable wells with an interface probe, no non-aqueous phase liquid (NAPL) was detected in any of the monitoring wells. As described in Section 2.1, field water quality parameter measurements were measured in each of the sampled wells during purging using a calibrated water quality meter and flow cell.

Water quality observations made throughout the GMEs during this monitoring period are available in the individual GME reports, attached as Appendix C. A summary of the water quality parameters and field observations from this annual reporting period are provided in Table 2-2.

Standing water levels have remained fairly consistent with previous years of monitoring (Figure 4). There is a distinct seasonal trend in response to the wet and dry season with groundwater levels being predominantly by rainfall driven recharge. During the wet season a groundwater mound emerges then dissipates in the dry season. There is some question around the validity of this data and actual purpose of the requirement this information to continue to be recorded. Daily groundwater levels may also be influenced by tidal activities, but this cannot be confirmed under the current dataset that has been collected and the results analysed. This has not been graphed as there is question around the validity of the dataset and the purpose of this comparison.

Section 2 Groundwater Monitoring

Note: SWL data for the offsite groundwater bores (EMB7, EMB12 and EMB15) was only available for late 2020 onwards, whereas onsite bore SWL data has been available since 2018.

Table 2-2 Groundwater quality parameters – July 2021 to June 2022

Well ID	SWL (mb TOC)	SWL (mBGL)	SWL (mAHD)	In-situ Parameters					
				pH	Temp (oC)	ORP (mv)	EC (μS/cm)	TDS (mg/L)	DO (%)
Monthly – 28 July 2021									
EMB 7	3.201	3.201	3.224						
EMB 12	2.838	2.838	3.662						
EMB 13	4.864	4.064	3.972	3.96	32.3	177.8	269.2	174.9	24.3
EMB 14	5.093	4.393	4.162	5.97	32.8	79.1	247.7	161.2	33.4
EMB 15	2.320	2.320	4.334						
Monthly – 25 August 2021									
EMB 7	3.147	3.147	3.278						
EMB 12	3.189	3.189	3.311						
EMB 13	5.258	4.458	3.578	3.81	31.6	187.4	267.7	174.2	19.6
EMB 14	5.088	4.388	4.167	6.32	32.1	81.5	423.6	275.6	29.3
EMB 15	2.542	2.542	4.112						
Quarterly – 23 September 2021									
EMB 7	2.569	2.569	3.856						
EMB 12	3.1	3.1	3.4						
EMB 13	5.246	4.446	3.59	7.24	31.8	-35.2	281.3	183.09	32.7
EMB 14	5.518	4.818	3.737	5.41	33.3	93.2	377.6	250.26	18.4
EMB 15	2.557	2.557	4.097						
Monthly – 20 October 2021									
EMB 7	3.602	3.602	2.823						
EMB 12	3.154	3.154	3.346						
EMB 13	5.268	4.468	3.568	3.82	33.1	137.8	281.7	182.65	23
EMB 14	5.587	4.887	3.668	5.63	34.2	369.2	400.1	249.6	39.5
EMB 15	2.546	2.546	4.108						
Monthly – 30 November 2021									
EMB 7	2.522	2.522	3.903						
EMB 12	2.291	2.291	4.209						
EMB 13	4.173	3.373	4.663	3.64	33	126.9	275.8	182.65	44.2
EMB 14	4.546	3.846	4.709	5.93	35	54.6	343.3	221	55
EMB 15	1.876	1.876	4.778						
Quarterly – 17 December 2021									
EMB 7	1.631	1.631	4.794						
EMB 12	2.741	2.741	3.759						

Section 2 Groundwater Monitoring

Well ID	SWL (mb TOC)	SWL (mBGL)	SWL (mAHD)	In-situ Parameters					
				pH	Temp (oC)	ORP (mv)	EC (μS/cm)	TDS (mg/L)	DO (%)
EMB 13	3.276	2.476	5.56	3.75	33.4	99.4	272.4	176.8	22.1
EMB 14	3.416	2.716	5.839	6.39	35.1	68	204.7	122.6	33
EMB 15	1.321	1.321	5.333						
Monthly – 21 January 2022									
EMB 7	1.038	1.038	5.387						
EMB 12	1.121	1.121	5.379						
EMB 13	2.283	1.483	6.553	3.85	33	58.3	256.1	168.25	7.9
EMB 14	1.709	1.009	7.546	6.3	34.1	29.6	193.7	125.45	52
EMB 15	0.678	0.678	5.976						
Monthly – 23 February 2022									
EMB 7	1.044	1.044	5.381						
EMB 12	1.175	1.175	5.325						
EMB 13	2.411	1.611	6.425	4.06	31.8	78.3	239.9	154.7	14
EMB 14	2.034	1.334	7.221	6.46	33.1	36.3	174.2	113.1	20.3
EMB 15	0.69	0.69	5.964						
Annual – 25 March 2022									
EMB 7	1.298	1.298	5.127	5.93	32.9	106.3	193.4	131.65	46.5
EMB 12	1.242	1.242	5.258	6.44	36.5	94.2	390.8	310.65	48.1
EMB 13	2.689	1.889	6.147	4	32.4	82.5	246.1	159.96	26.8
EMB 14	2.665	1.965	6.59	5.45	35.5	118.8	211.4	148.25	32.6
EMB 15	0.794	0.794	5.86	4.29	35.5	172.8	201.3	932.3	64.7
Monthly – 13 April 2022									
EMB 7	1.268	1.268	5.157						
EMB 12	2.686	2.686	3.814						
EMB 13	2.823	2.023	6.013	3.94	32.8	46.5	258.9	167.65	17.1
EMB 14	2.924	2.224	6.331	6.39	33.8	-6.4	217.7	141.7	26
EMB 15	0.957	0.957	6.427						
Monthly – 25 May 2022									
EMB 7	2.141	2.141	4.284						
EMB 12	1.974	1.974	4.526						
EMB 13	3.777	2.977	5.059	3.91	33.0	36.7	260.5	169.65	15.7
EMB 14	3.998	3.298	5.257	6.36	34.3	-14.8	243.9	158.6	16.3
EMB 15	0.55	0.55	6.834						

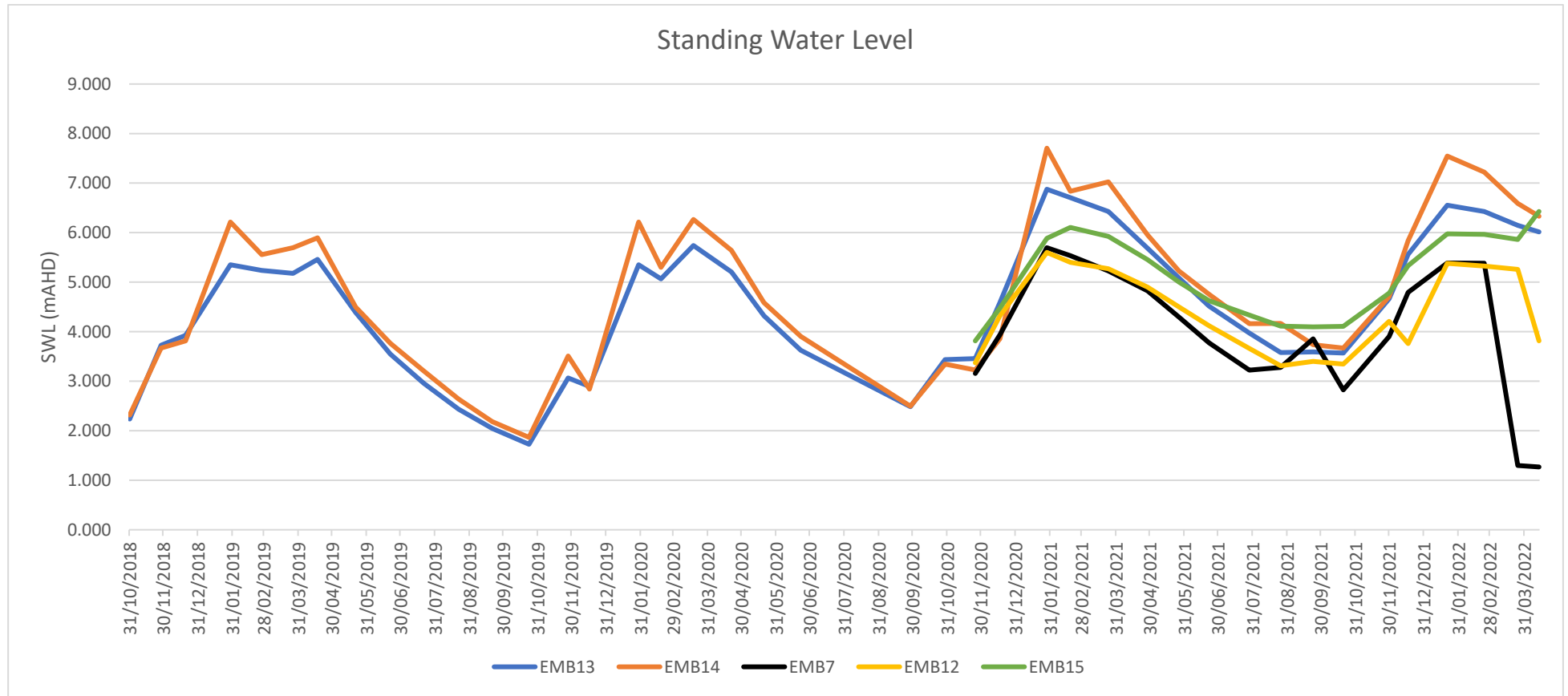


Figure 4 Standing Water Level (mAHd)

2.4.2 Water Quality Results Assessment

The results are shown in Appendix D as raw data, there are no trigger values to assess against. The majority of analysis was undertaken at Eurofins Laboratory, whilst the data in blue shading depicts the tests undertaken at ALS Laboratory. The results of the groundwater analysis are summarised in the appendices of the individual monitoring reports attached as Appendix C. These results are provided both in the raw laboratory report documentation and summarised within the individual reports for reference. The laboratory analytical results are presented in Appendix B of the monitoring event-dedicated reports.

The majority of BTEXN, TRH, PFAS and Glycols have been consistently recorded below the laboratory limit of reporting (LOR). Results detected above the LOR are generally below the acceptance criteria.

The major anions and cations have generally increased during the annual monitoring event in the peak of the wet season with lower results during the monthly GMEs in the drier months. There is no trend differentiation for the dissolved metals.

Key groundwater analytical data is presented in the graphs below. Due to a lack of data for the offsite bores, only data from the onsite bores have been depicted. As more data becomes available, the data from offsite bores will be included. Trend lines and associated r^2 values have been included on the graphs. The trend lines show the general changes of data (increases or decreases) across time and the r^2 values show the strength or reliability of those trends. R^2 values range between 0 and 1. The higher the number (i.e. closer to 1) the stronger or more reliable the trend. The lower the number (i.e. closer to 0) the weaker or less reliable the trend.

Key findings from a review of the water quality results:

- Generally, the water quality at the Site is indicative of a shallow freshwater aquifer, even given its proximity to the coastline, the EC values throughout the year indicate that there is no saltwater intrusion into this aquifer.
- pH values observed in groundwater are slightly to moderately acidic, which is common in Top End groundwaters.
- TDS values are relatively low at the conclusion of purging the wells, which typically accumulate some sediment between GMEs while the wells are undisturbed. This trend is observed during sampling, where the initial groundwater water quality readings during pumping show high turbidity values, decreasing as groundwater purging continues.
- Nutrient concentrations (Total Nitrogen, Oxides of Nitrogen and Total Phosphorus) have generally been decreasing in the onsite bores since 2018. NH_3 concentrations show a general increasing trend. These trends are considered weak with low r^2 values (Figure 5; Figure 6; Figure 7; Figure 8).
- Dissolved metal concentrations generally show a decreasing trend at site since 2018 (Figure 9; Figure 10; Figure 11; Figure 12; Figure 13; Figure 14; Figure 15). Selenium and zinc concentrations show a weak increasing trend (Figure 16; Figure 17). These trends are considered weak due to their low r^2 values, however, this may also indicate that concentrations are generally remaining stable.
- Hydrocarbon levels remained stable across monitoring events, as shown by the low r^2 value (Figure 18). Naphthalene concentrations have a generally decreasing trend across monitoring events (Figure 19). This trend is considered weak due to the low r^2 value. It is noted that for these parameters, for events where there is no data available, events have been displayed as 0 and the graphs appear to infer there have been spikes in the concentration levels. The raw data is presented in Appendix D.
- PFAS (Figure 20), Total Cyanide (Figure 21) and Phenols (Figure 22) concentrations have shown weak increasing trends at site across monitoring events as inferred from the low r^2 values. These weak trends generally infer that these concentrations are remaining stable.

The low r^2 values and weak trends reflects the highly variable data from seasonal changes between the wet and dry seasons and the limited data sets. Low r^2 values may also indicate that data points are remaining stable. As more data becomes available it is expected that the strength of the trends will increase, i.e. they will become more accurate.

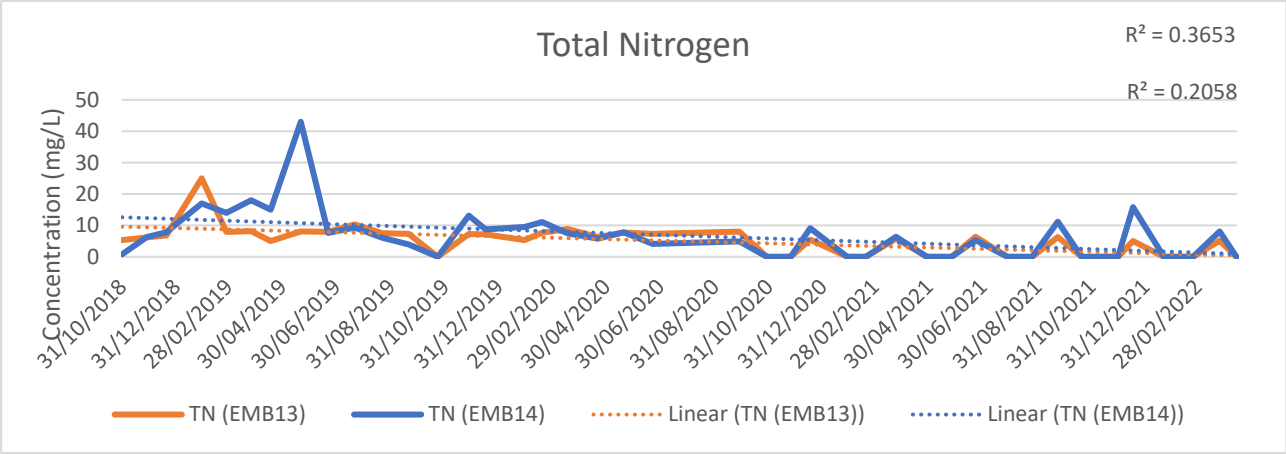


Figure 5 Total Nitrogen Concentrations

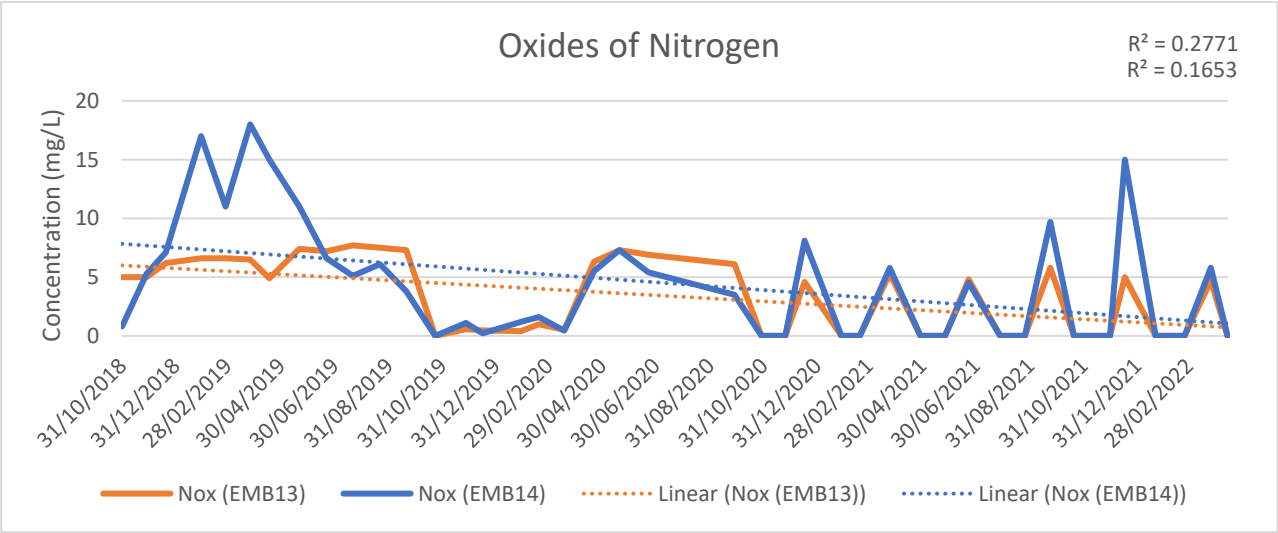


Figure 6 Oxides of Nitrogen Concentrations

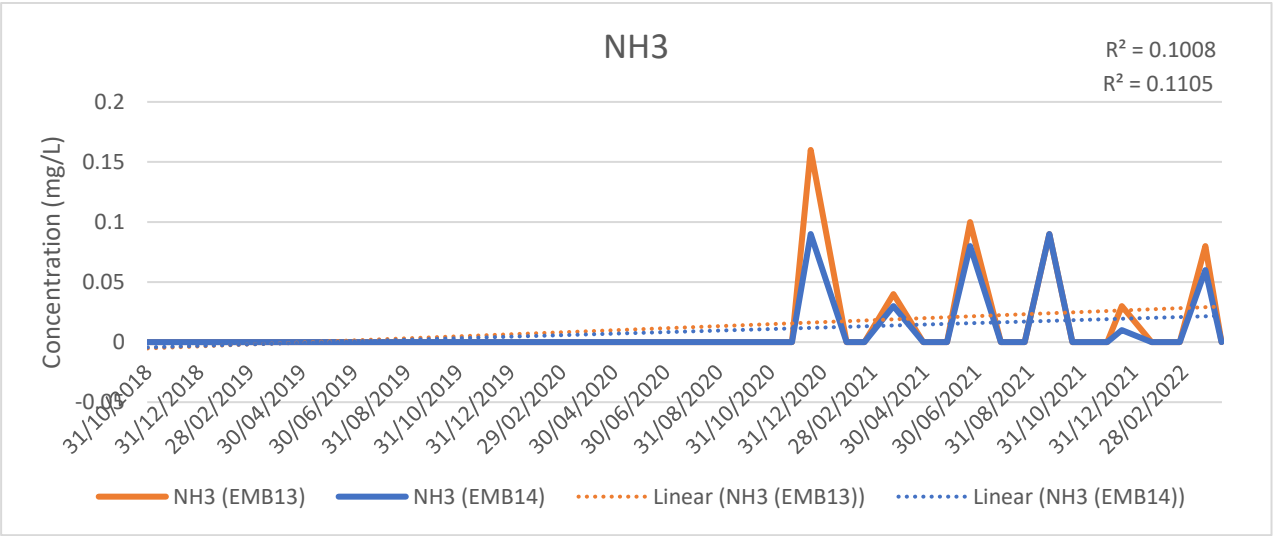


Figure 7 NH3 Concentrations

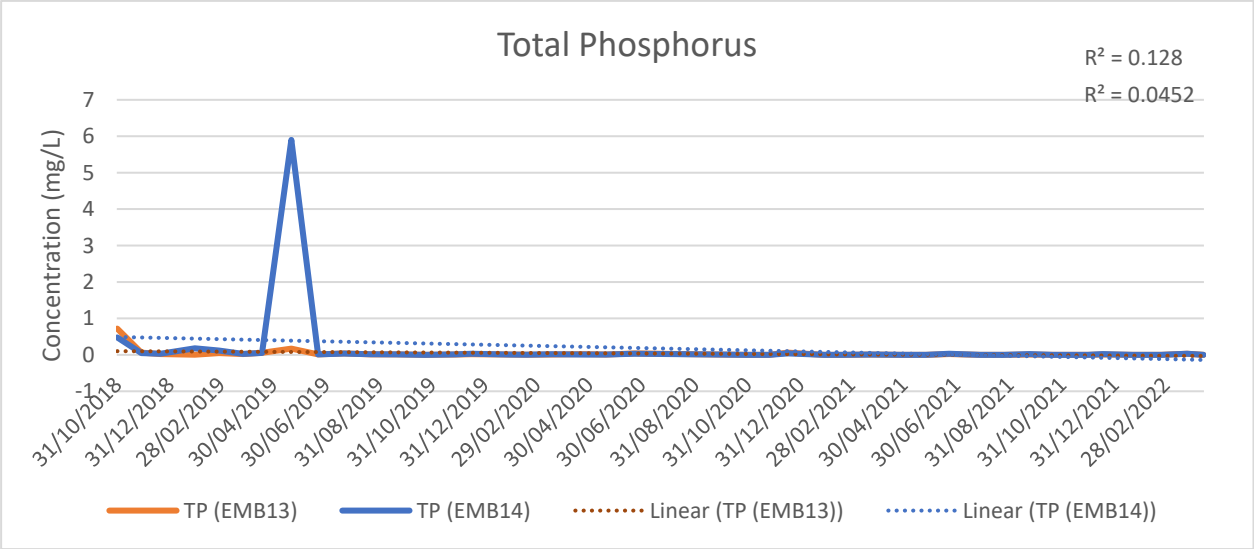


Figure 8 Total Phosphorus Concentrations

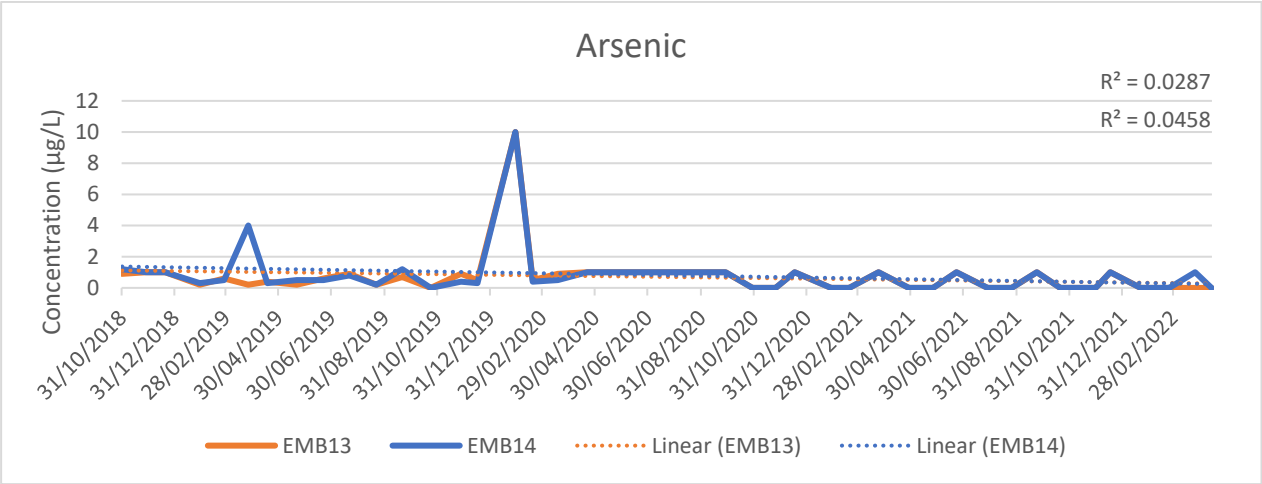


Figure 9 Arsenic Concentrations

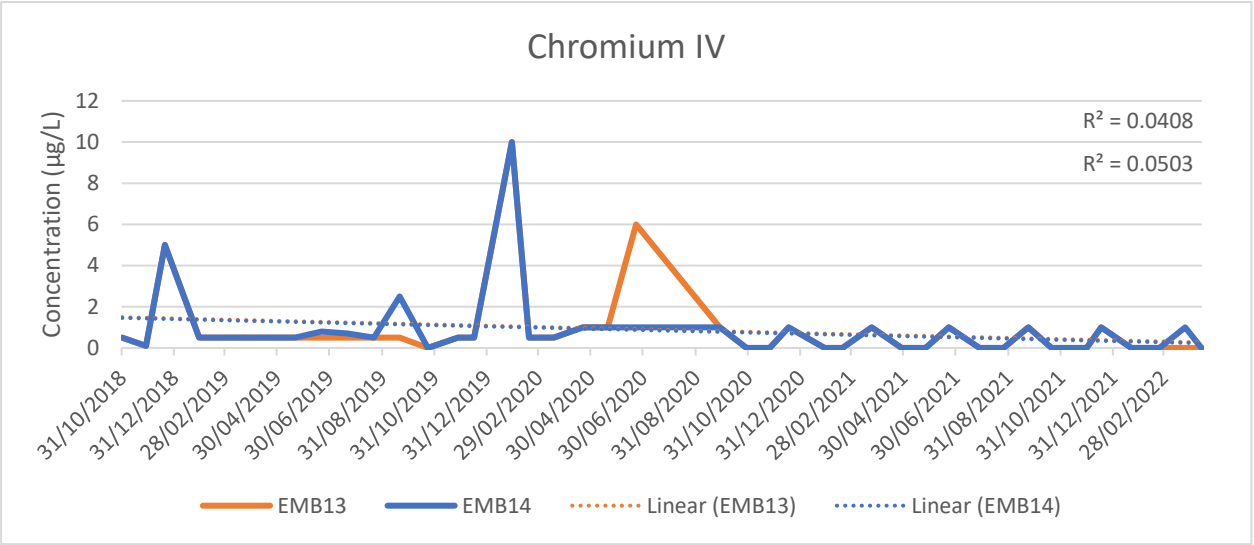


Figure 10 Chromium IV Concentrations

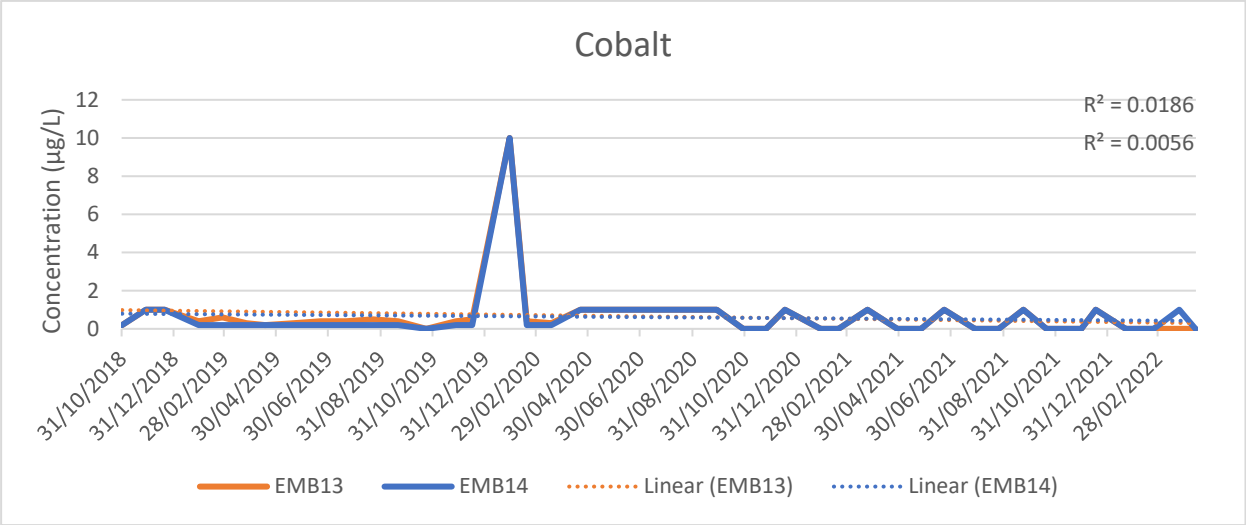


Figure 11 Cobalt Concentrations

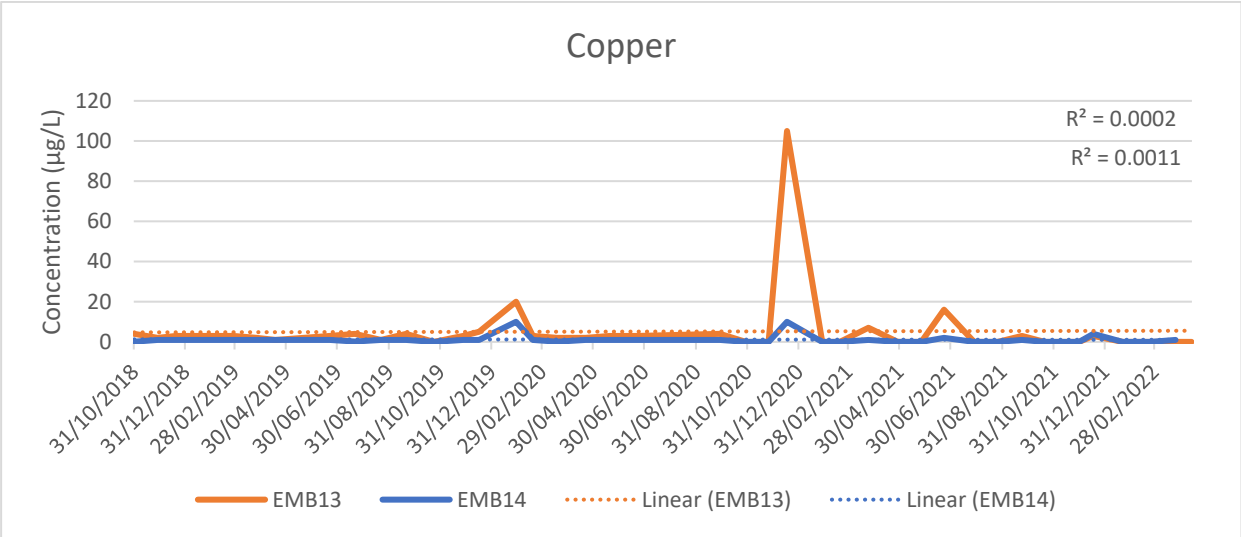


Figure 12 Copper Concentrations

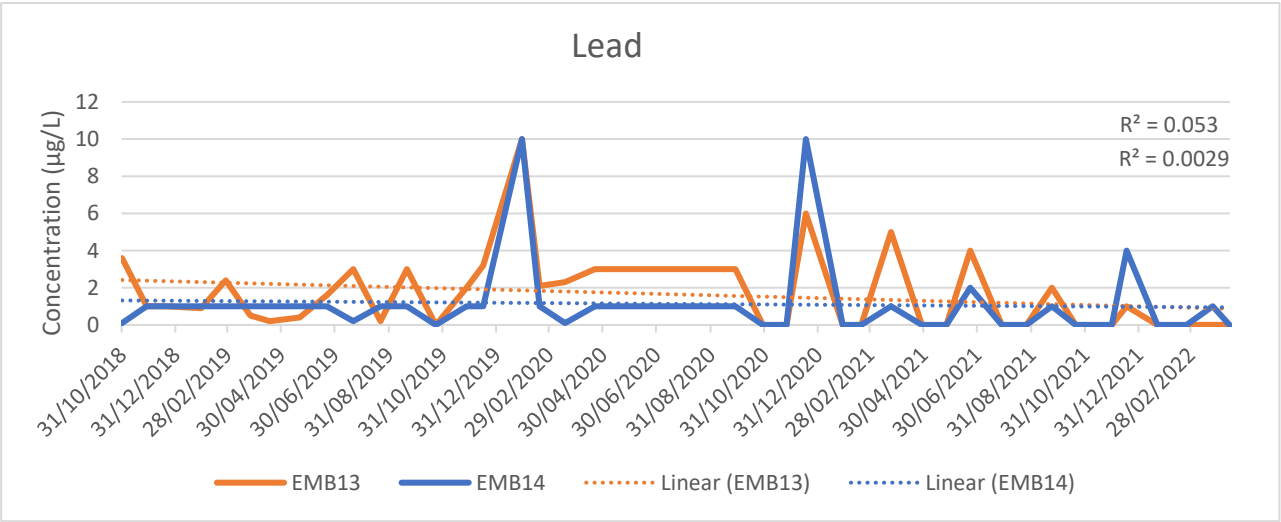


Figure 13 Lead Concentrations

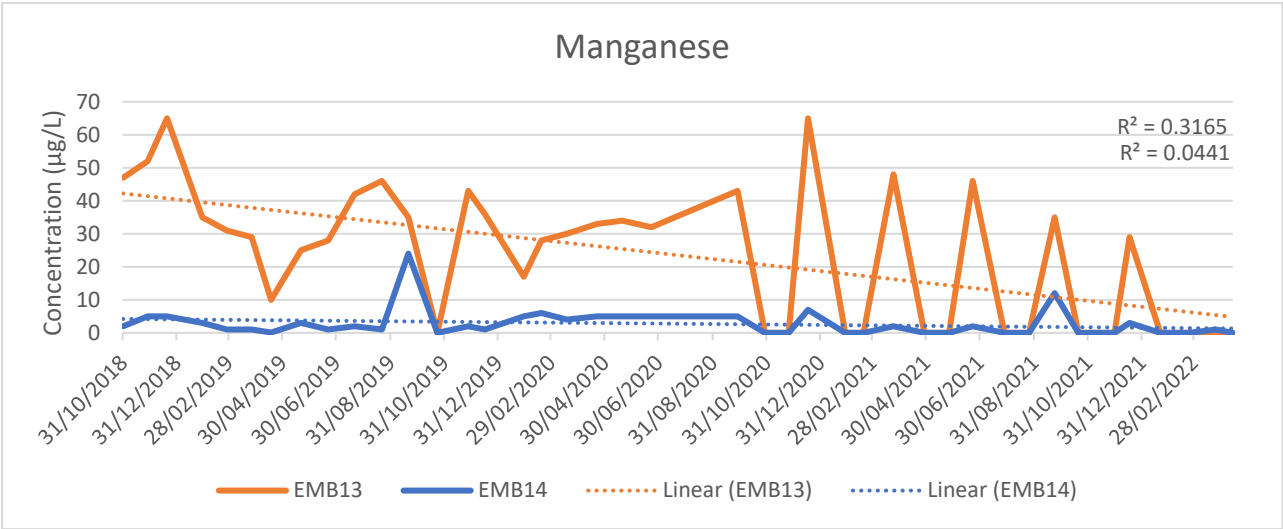


Figure 14 Manganese Concentrations

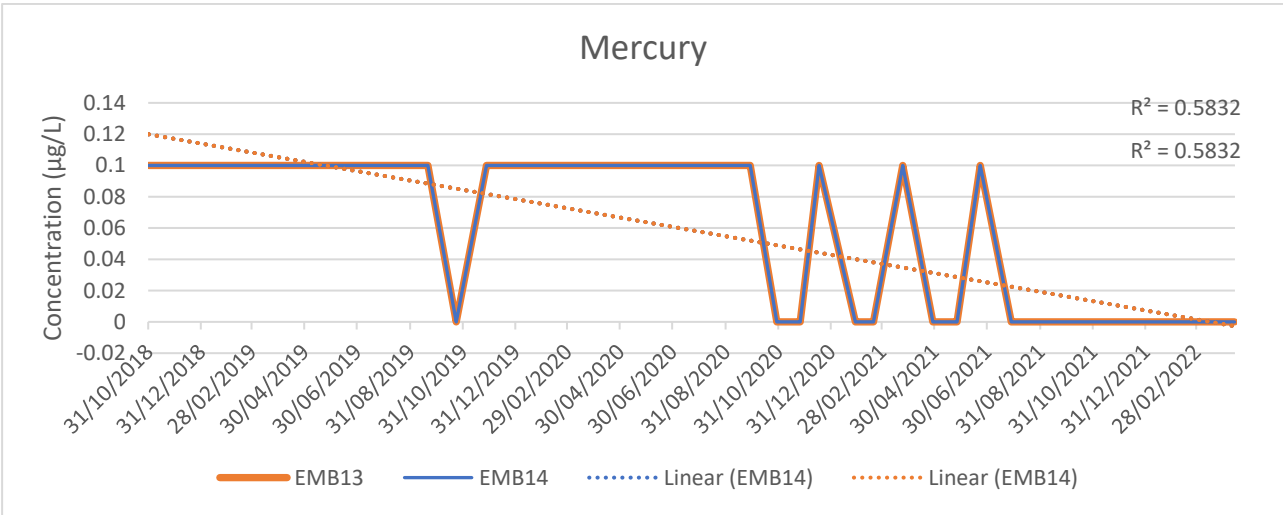


Figure 15 Mercury Concentrations

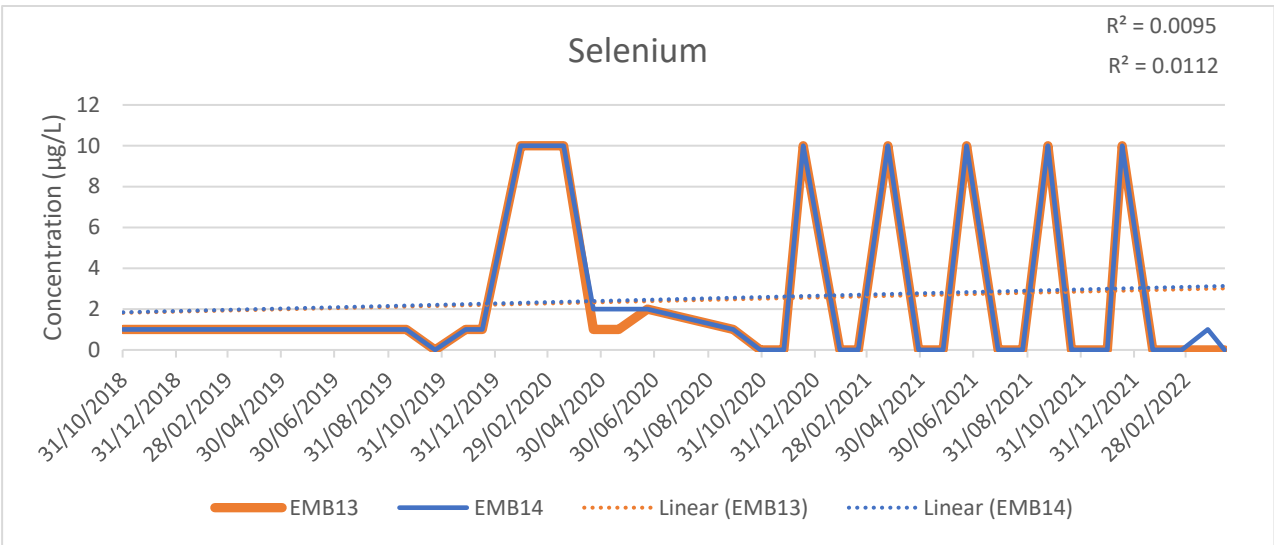


Figure 16 Selenium Concentrations

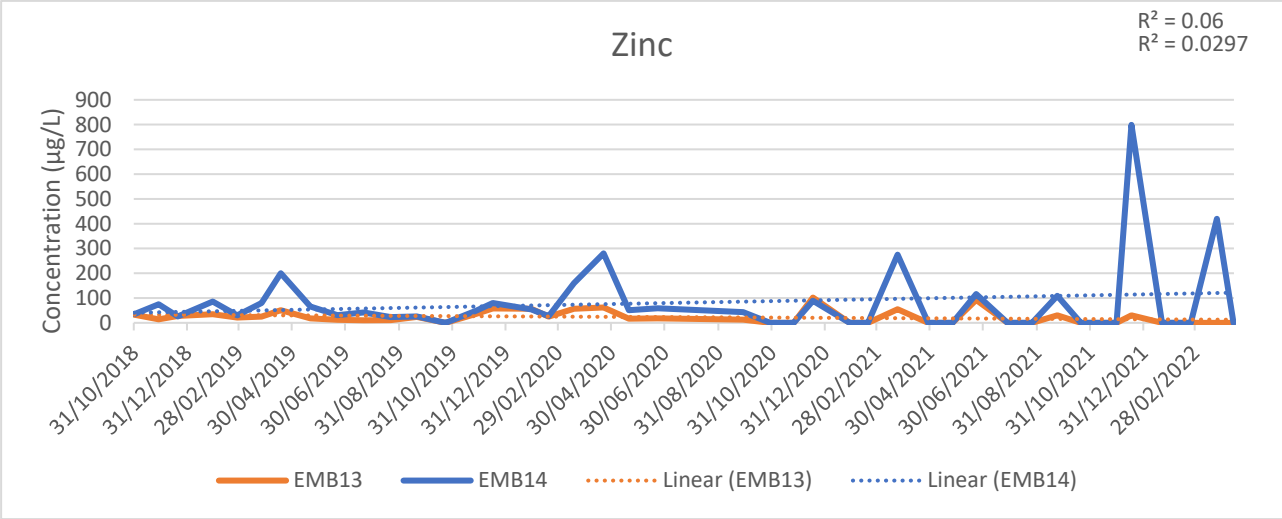


Figure 17 Zinc Concentrations

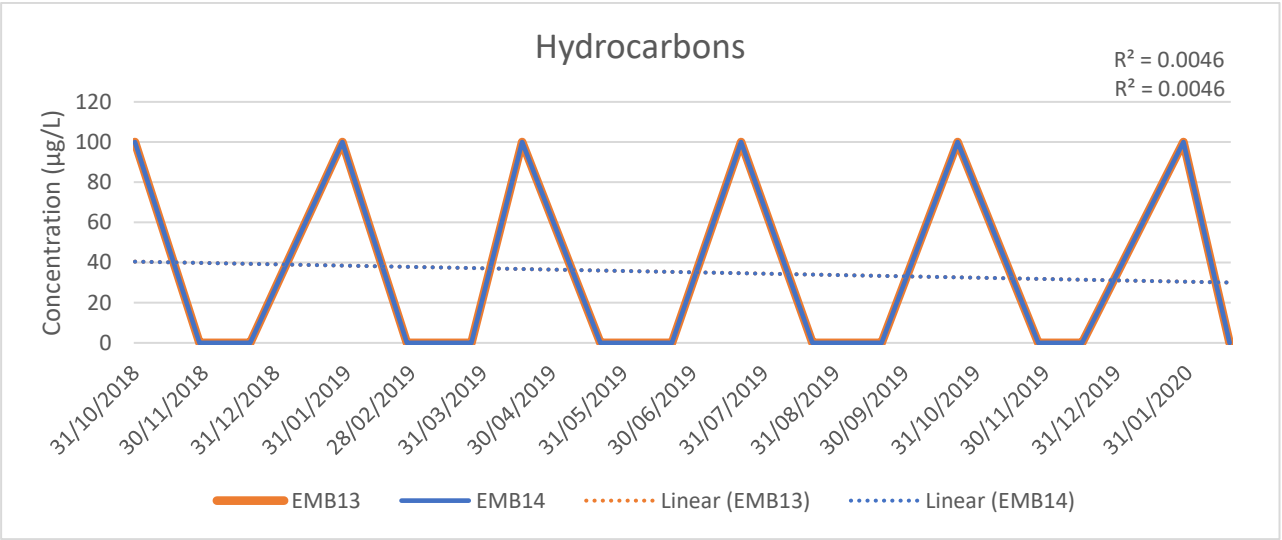


Figure 18 Hydrocarbon Concentrations

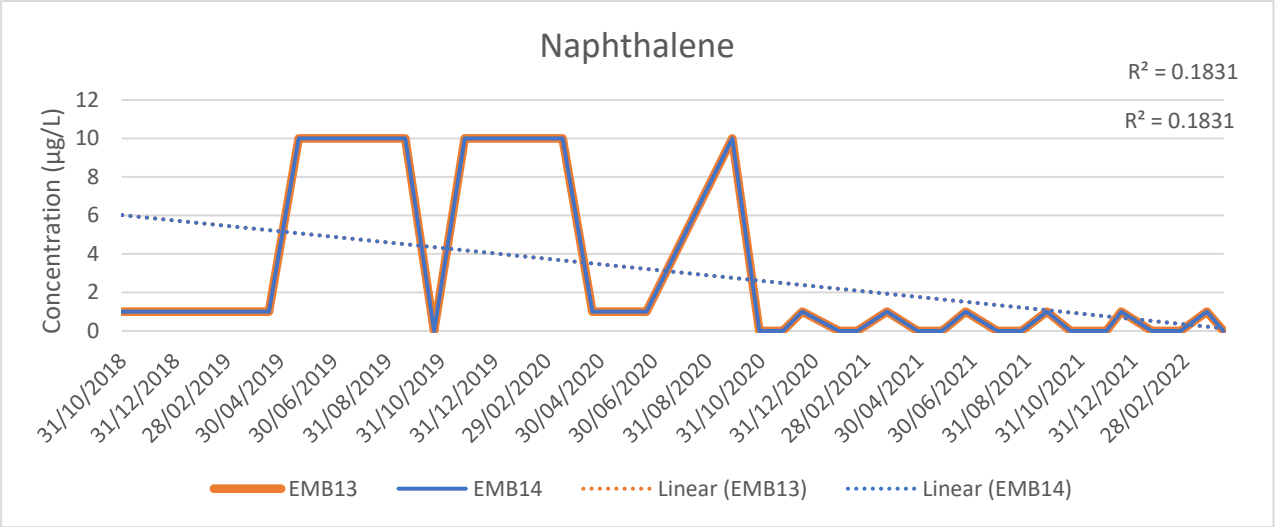


Figure 19 Naphthalene Concentrations

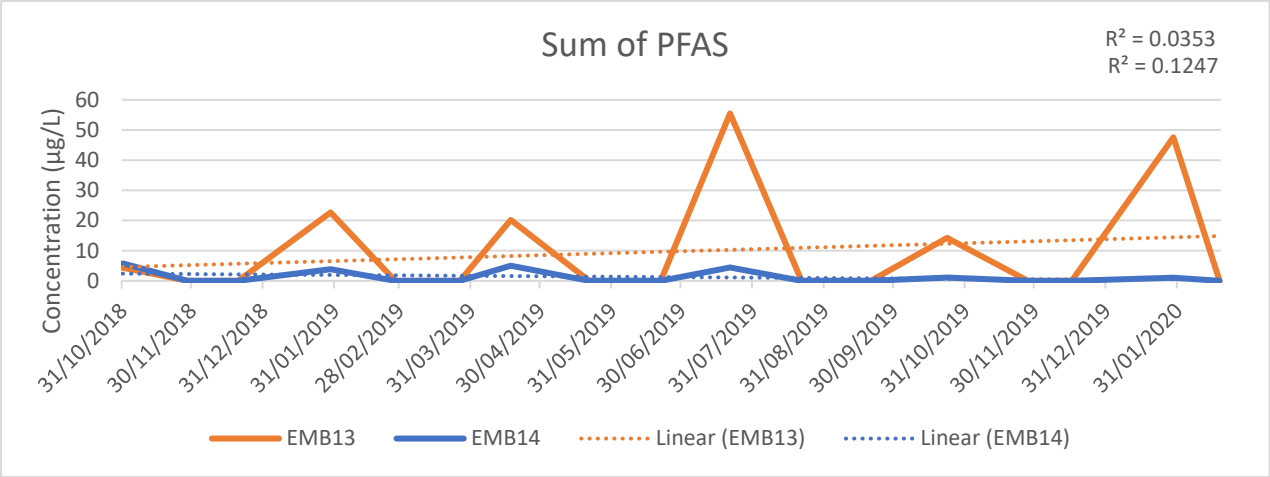


Figure 20 Sum of PFAS Concentrations

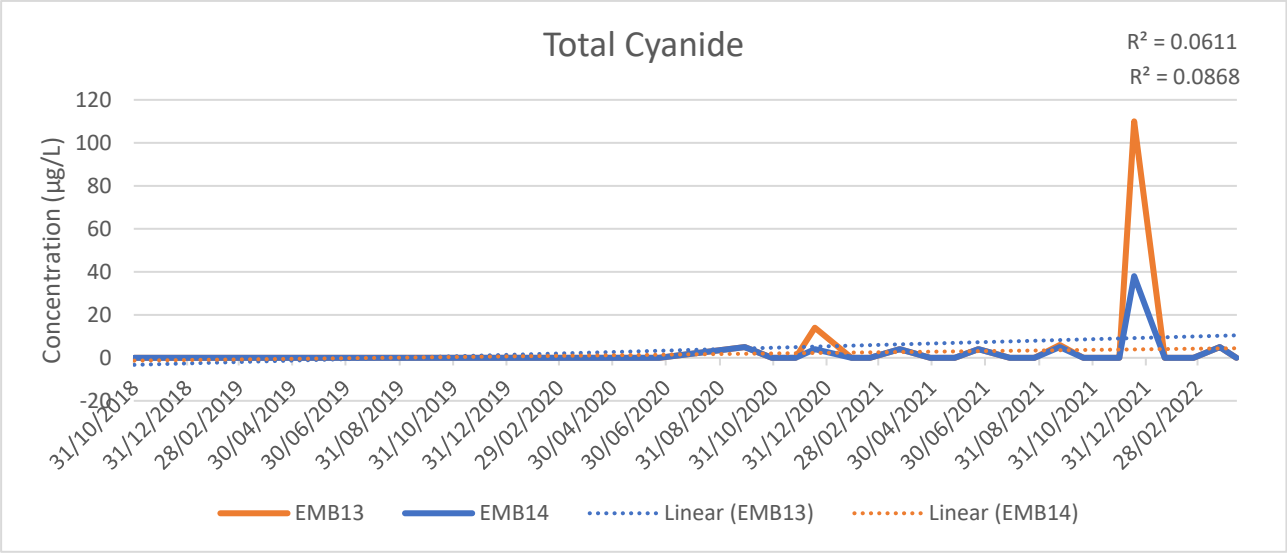


Figure 21 Total Cyanide Concentrations

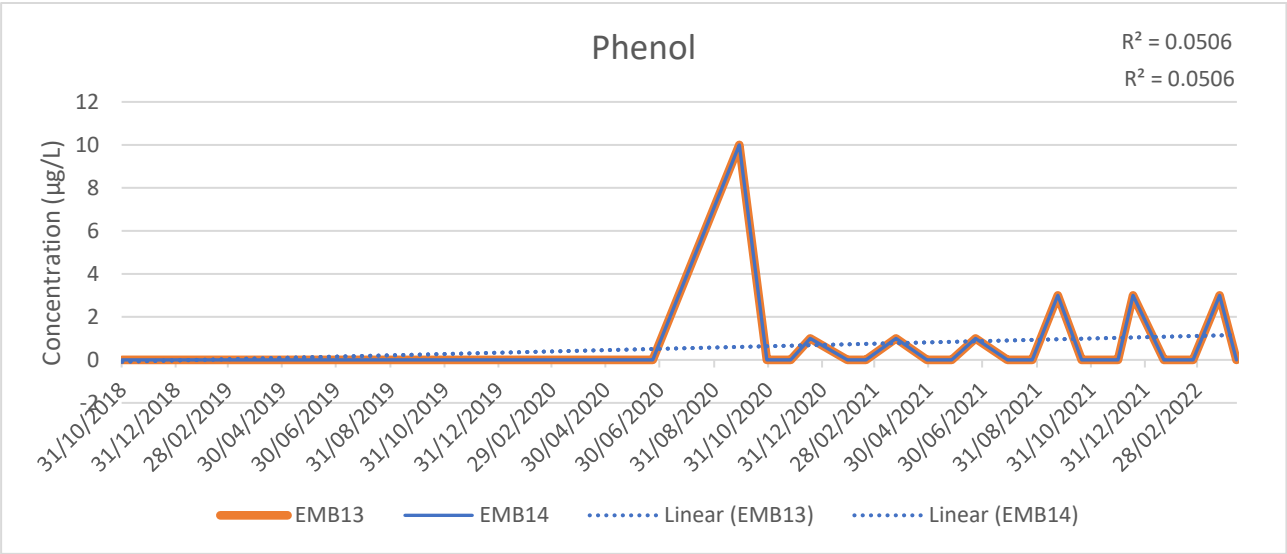


Figure 22 Phenol Concentrations

2.4.3 Compliance with Licence Conditions and Discussion

As per Clause 42 of EPL229-01 (July 2021 to June 2022), the licensee must conduct groundwater monitoring in accordance with Attachment B (monthly, quarterly and annually). Based on this clause there are no non-compliances.

There are likely to be background levels of some heavy metals in the wider East Arm area based on historical results prior to the site becoming operational. Weak trends (both increasing and decreasing) in dissolved metals indicate that past and current activities on site are unlikely to have had an impact on heavy metal concentrations.

It is recommended in the recent GRR EPL229-01 compliance audit that the monitoring regime: remove requirement for monthly ground water height and measuring the field parameters. GRR facility has no direct impact to groundwater levels or parameters measured in the field results and capturing this data does not provide any relevant information. What is the real comparison of groundwater levels to tidal influences on this site? It is reclaimed land and as such the groundwater aquifer has already been discreetly compromised.

EPL229-01 does not provide any specific trigger values for assessment of PFAS; however, whilst technically not a non-compliance of conditions 60.1 or 60.2, PFAS compounds were reported above the limit of reporting (0.1 µg/L) in samples collected from EMB13 and EMB14 during all monitoring events from July 2021 to June 2022. Historical data prior to July 2021, have reported concentrations of PFAS compounds above the limit of reporting. Weak increasing trends have been determined for EMB13 and EMB14 since 2018. Due to the low r^2 value of these weak trends, the concentrations are generally considered stable. The data indicates that historically PFAS concentrations have been present in the groundwater at the site before the site was operational (pre-2018) and while the source of contamination is unknown, it is unlikely that past and current activities on the site have had an impact on the concentrations.

The significant environmental receptors are the mangrove communities and the Darwin Harbour to the east and west of the site. Groundwater flow direction during the wet season (December to April) is generally moving in a northwest direction, toward the mangrove community and Darwin Harbour. During the dry season (April to October), groundwater is flowing in a northeast direction towards Berrimah.

While the potential for groundwater contamination is minimised through the extensive use of impervious surfaces across the site and through all storage tanks being above ground and located in bunded concrete containment areas; groundwater contamination is recognised as a potential risk as contamination could be associated with loss of integrity in bunded containment structures in operations areas or through the interaction of surface water with ground water following an uncontained spill outside operational areas. Such occurrences could result in the uncontrolled release of waste materials into the groundwater system which could impact on local marine environment.

Section 3 Surface Water Monitoring

In accordance with EPL requirements, the Surface Water Monitoring events are undertaken as per EPL229-01 Attachment A which outlines the surface water monitoring scope and analytical program. The purpose of the surface water monitoring is to measure in-situ parameters and collect surface water samples for laboratory analysis from the stormwater discharge pit. The stormwater discharge pit and monitoring location is presented in Figure 23.

The stormwater process is presented in Appendix E, with daily in-situ parameters taken during release times and monthly full analytical suites in compliance with Attachment A of EPL 229-01.

The Surface Water Monitoring for full analytical suites during this annual reporting period were undertaken monthly on the following dates:

- 5 October 2021
- 23 November 2021
- 13 December 2021
- 12 January 2022
- 9 February 2022
- 15 March 2022
- 12 April 2022

There was no surface water discharge between the months of July 2021 and October 2021, so no monitoring was undertaken.

Specific details on the methodologies implemented for each surface water sampling event are described below. A summary of the typical surface water sampling programme and testing schedule is described in Table 3-1.

Table 3-1 Surface Water Sampling Programme 2021-2022

Sample Round	Environmental Monitoring Bores	Analysis
Daily	SWMP1	In-situ parameters (pH, temp, EC, DO)
Before a discharge event	SWMP1	In-situ parameters (pH, temp, EC, DO) Nutrients (NH ₃ , NO _x , TKN, TN, TP) Metals (Sb, As, Ba, Be, Bo, Cd, Cr, Cu, Co, Cu, Pb, Mn, Mo, Ni, Se, Ag, Sn, V, Zn, Hg) Total Recoverable Hydrocarbons BTEXN Polycyclic Aromatic Hydrocarbons Cyanide Glycols Major Anions (Alkalinity, Sulfate, Chloride, total) Major Cations (Ca, Mg, K, Na total) PFAS Polychlorinated Biphenyls Total Suspended Solids (TSS) Total Dissolved Solids (TDS)



Figure 23 Darwin Liquid Waste Treatment Stormwater Monitoring Location

3.1 Surface Water Sampling Methodology

Surface water monitoring has been undertaken at site since October 2018. GRR staff undertake the surface water monitoring and samples are collected from the final chamber of a stormwater pit. Field readings are taken from the contents of the sample bucket using a portable probe. Samples required for laboratory analysis are transferred directly into the relevant sample bottles from the same bucket.

The following methodology was applied:

- Sample jars and sample bucket are collected from an appropriate laboratory.
- The rain gauge is checked and the reading is recorded.
- The jar labelled as 'Rain' is filled with contents from the gauge. If there is not enough to fill the jar, the rain bucket around the side of the administration building is used to fill the jar. The rain bucket is then emptied.
- A bucket connected to a chain is lowered into the stormwater pit, filled with water and raised.
- A jar labelled, 'Stormwater' is rinsed three times with the water from the stormwater pit, then the jar is filled.
- The bucket is emptied back into the pit and is left upside down, near the pit.
- The sampler wore a clean pair of disposable nitrile gloves when collecting each sample.
- All surface water samples were collected in appropriate bottles/containers provided by analytical laboratories and placed in a chilled esky for transportation immediately after collection.

The field records and calibration records of surface water sampling events undertaken by GRR staff are provided in Appendix F and laboratory certificates are provided in Appendix G.

GRR has also established its own laboratory facilities on site to enable it to test incoming waste streams, monitor and develop treatment methodologies and monitor compliance. The Laboratory is also utilised for analysis of the product glycol and oils generated prior to sale.

3.2 Surface Water Assessment Criteria

The EMP and EPL 229-01 prescribes several surface water assessment criteria to determine the acceptability and investigation limits of individual analytes in the water before it is discharged from site. Where exceedances to these criteria are reported from field water quality measurements or laboratory results, EPL 229-01 requires notification of these exceedances to NT EPA in accordance with EPL Clause 54.

These acceptance criteria have been summarised in Table 3-2.

Table 3-2 EPL 229-01 Surface water acceptance criteria values

Parameter	Units	Acceptance Limit (EPL 229-01 Attachment A)
In-situ		
pH	pH units	7.0-8.5
Dissolved Oxygen	%	80-100
Nutrients		
Total Phosphorous	µg/L	20
Total Nitrogen	µg/L	270
Oxides of Nitrogen	µg/L	20
Ammonium	µg/L	20
Metals (total and dissolved)		
Antimony	µg/L	270
Arsenic	µg/L	4.5
Boron	µg/L	5,100
Cadmium	µg/L	5.5
Chromium VI	µg/L	4.4
Cobalt	µg/L	1
Copper	µg/L	1.3
Lead	µg/L	4.4
Manganese	µg/L	80
Mercury	µg/L	0.4
Nickel	µg/L	70
Selenium	µg/L	3
Vanadium	µg/L	100
Zinc	µg/L	15
Hydrocarbons		
Benzene	µg/L	700

Parameter	Units	Acceptance Limit (EPL 229-01 Attachment A)
Toluene	µg/L	180
Naphthalene	µg/L	70
Other		
PFOS	µg/L	0.13
PFAS	µg/L	220
Total Cyanide	µg/L	4
Phenols	µg/L	400
TSS	mg/L	10

3.3 Quality Assurance/Quality Control

Stormwater samples were collected from the relevant surface water monitoring location on all occasions. Quality Assurance / Quality Control (QA/QC) measures for this investigation were based on AS4482.1–2005 and include:

- Appropriate sample labelling, preservation, storage and transport under chain of custody procedures.
- Laboratory analyses conducted within appropriate holding times.
- The use of laboratories that hold NATA accreditation for the analyses undertaken. The laboratories used for the analyses were Eurofins. The laboratories are approved by the National Association of Testing Authorities (NATA), and the analyses conducted are within the NATA registration of the laboratories.

The QA/QC controls are considered adequate as per the relevant standards and guidelines.

3.4 Surface Water Monitoring Results

The methodologies described in Section 3.1 were implemented during each of the surface water monitoring events during this annual reporting period. Field water quality parameter measurements (Table 3-3) were collected at the sample site using a calibrated water quality meter. The analytical and physico-chemical results are presented in a spreadsheet (Appendix H). Table 3-4 provides a summary of the results from the monthly monitoring events for this annual reporting period. Due to data of the majority of parameters being unavailable for the initial years of monitoring, the long term average has been based on the 2020/2021 and 2021/2022 reporting periods. As more data becomes available each year, these averages will become more refined and trends will be determined.

Table 3-3 In-situ Surface Water Monitoring Parameter Results

Site ID	Date	In-situ Parameters			
		Temperature (°C)	pH	EC (µS/cm)	DO (%)
SWMP1	05/10/2021				
SWMP1	23/11/2021	25	6.82	1654	88.7
SWMP1	02/12/2021	25	7.09	414	88.9
SWMP1	13/12/2021	26	6.9	372	89.3
SWMP1	12/01/2022	29	6.02	606	83.6
SWMP1	09/02/2022	24	6.66	311	84.4
SWMP1	22/02/2022	25	5.63	337	87.6
SWMP1	15/03/2022	25	6.58	281	86.6

Section 3 Surface Water Monitoring

Site ID	Date	In-situ Parameters			
		Temperature (°C)	pH	EC (µS/cm)	DO (%)
SWMP1	23/03/2022	30	7.58	201	86.2
SWMP1	12/04/2022	31	6.05	456	85.2

Key findings from a review of the water quality results include:

- In-situ measurements were generally within the licence trigger value range, with the exception of pH. Notification of a trigger value exceedance was reported to the NT EPA on 8 February 2022.
- Nutrients (Total Phosphorous, Total Nitrogen, Oxides of Nitrogen and Ammonium) significantly exceeded the licence trigger values multiple times throughout the reporting period (Figure 24 and Figure 25). These exceedances were considered reportable as they occurred across at least three consecutive monitoring events and were also on occasion, determined to be more than three times the licence trigger value. The 2022 average concentrations for these parameters also exceeded the trigger values.
- Nine metals (Arsenic, Chromium IV, Cobalt, Copper, Lead, Manganese, Mercury (inorganic), Selenium and Zinc) were determined to exceed the licence trigger values. The majority of these metals exceeded trigger values for at least half the months of the reporting period that had been sampled (Figure 26; Figure 27; Figure 28; Figure 29; Figure 30; Figure 31; Figure 32; Figure 33; Figure 34). The 2022 average concentrations for these parameters also exceeded the trigger values.
- Exceedances were recorded for Naphthalene from the hydrocarbons. However, exact values have not been determined for this parameter (Figure 35). Each result was preceded by '<' indicating that naphthalene had been detected, but not at precise concentrations. Data for naphthalene has been displayed conservatively, i.e. it has been assumed that the detection has been at the upper limit of the possible detection range. For example, where naphthalene has been recorded as <100 µg/L, it has been assumed that the reading was 100 µg/L.
- Higher concentrations, and hence exceedances, were recorded earlier in the reporting period for PFOS (Figure 36) with exceedances reported in October, November and December 2021 and February 2022. The exceedance in February was also well above three times the trigger value.
- Every month sampled during the reporting period for total cyanide concentrations was above the licence trigger value (Figure 37). None of these exceedances were equal to or more than three times the trigger value.
- All total halogenated phenol concentrations were below the licence trigger value. Three exceedances were detected for non-halogenated phenols in October 2021, December 2021 and February 2022 (Figure 38). Though these exceedances were not in consecutive months, the exceedances in October and December were both more than three times the trigger value.
- All results for total suspended solids, except for two, were above the licence trigger values in the reporting period (Figure 39). Two of these exceedances (November and December 2021) were also more than three times the trigger value.
- Trend lines and r^2 values were included on each graph to present the general increases and decreases in concentrations over time and the relative strength (i.e., reliability) of these trends. All parameters, except for oxides of nitrogen, had increasing concentration trends. All trend lines had very low r^2 values, indicating that the strength of these trends is weak (i.e., low reliability). These weak trends also imply that concentrations are generally remaining stable.

Section 3 Surface Water Monitoring

Table 3-4 Surface Water Monitoring Results Summary – July 2021 to June 2022

Parameter	Limit of Reporting (LOR)	Licence Trigger Value	Monitoring Frequency	2022 Value Range	2022 Average	Long-term Average (2020 – 2022) ^	2022 Reportable Exceedances* *
In-situ*							
Temp (°C)		-	Monthly	24.0 – 29.0	25.67	28.79	-
pH		7.0-8.5	Monthly	5.63 – 7.09	6.52	7.05	Yes
EC (us/cm)		-	Monthly	311 – 1,654	615.67	288.32	-
Dissolved Oxygen (%)		80-100	Monthly	83.3 – 89.3	87.08	84.53	No
Major Ions							
Calcium (mg/L)	0.5	-	Monthly	9.2 – 470	68.11	43.89	-
Magnesium (mg/L)	0.5	-	Monthly	0.5 – 20	3.63	3.39	-
Sodium (mg/L)	0.5	-	Monthly	4.8 – 510	88.68	192.84	-
Potassium (mg/L)	0.5	-	Monthly	1.9 – 40	11.81	7.78	-
Carbonate (mg/L)	10	-	Monthly	<10 – <20	14.00	13.36	-
Bicarbonate (mg/L)	20	-	Monthly	38 – 560	167.89	112.62	-
Chloride (mg/L)	1	-	Monthly	20 – 600	108.10	95.19	-
Sulphate (mg/L)	5	-	Monthly	<5 – 41	8.60	9.06	-
Nutrients							
Total Phosphorous (µg/L)	10	20	Monthly	50 – 2,400	385.56	218.51	Yes
Total Nitrogen (µg/L)	200	270	Monthly	400 – 3,300	1,719	1,189.74	Yes
Oxides of Nitrogen (µg/L)	50	20	Monthly	<50 - <250	130	130	Yes
Ammonium (µg/L)	10	20	Monthly	<1 – 2,600	470.1	260.05	Yes
Metals							
Antimony (µg/L) (total)	5	270	Monthly	<5 – <50	27.5	19.11	No
Antimony (µg/L) (dissolved)	5	270	Monthly	<5 – <50	19	14.86	No

Section 3 Surface Water Monitoring

Parameter	Limit of Reporting (LOR)	Licence Trigger Value	Monitoring Frequency	2022 Value Range	2022 Average	Long-term Average (2020 – 2022) ^	2022 Reportable Exceedances* *
Arsenic (µg/L) (total)	1	4.5	Monthly	3 – <100	18.1	10.27	Yes
Arsenic (µg/L) (dissolved)	1	4.5	Monthly	<1 – <10	6.2	3.67	Yes
Barium (ug/L) (total)	20	-	Monthly	90 – 1,500	460	409.3	-
Barium (ug/L) (dissolved)	20	-	Monthly	80 – 1,400	388	363.3	-
Beryllium (ug/L) (total)	1	-	Monthly	<1 – <10	5.5	3.17	-
Beryllium (ug/L) (dissolved)	1	-	Monthly	<1 – <10	7.67	2.72	-
Boron (µg/L) (total)	50	5,100	Monthly	<0.2 – 3,500	806.69	661.93	No
Boron (µg/L) (dissolved)	50	5,100	Monthly	<0.2 – 3,200	498.91	485.18	No
Cadmium (µg/L) (total)	0.2	5.5	Monthly	<0.2 – <2	0.8	0.69	No
Cadmium (µg/L) (dissolved)	0.2	5.5	Monthly	<0.2 – <1	1.2	0.65	No
Chromium VI (µg/L) (total)	1	4.4	Monthly	1 – 21	7.3	4.72	Yes
Chromium VI (µg/L) (dissolved)	1	4.4	Monthly	<1 – 17	9.17	3.82	Yes
Cobalt (µg/L) (total)	1	1	Monthly	3 – 23	8.67	5.41	Yes
Cobalt (µg/L) (dissolved)	1	1	Monthly	<1 – 23	10.5	5.01	Yes
Copper (µg/L) (total)	1	1.3	Monthly	<1 – <50	10.7	6.25	Yes
Copper (µg/L) (dissolved)	1	1.3	Monthly	<1 – <50	14.33	4.9	Yes
Lead (µg/L) (total)	1	4.4	Monthly	<1 – 10	5.6	3.87	Yes
Lead (µg/L) (dissolved)	1	4.4	Monthly	<1 – <10	7.67	3.37	Yes
Manganese (µg/L) (total)	5	80	Monthly	130 – 6,100	1,082	658.58	Yes
Manganese (µg/L) (dissolved)	5	80	Monthly	120 – 6,000	1,015	600.72	Yes
Mercury (inorganic) (µg/L) (total)	0.1	0.4	Monthly	<0.1 – 2.6	0.71	0.46	Yes
Mercury (inorganic) (µg/L) (dissolved)	0.1	0.4	Monthly	<0.1 – 1.6	0.61	0.41	Yes
Nickel (µg/L) (total)	1	70	Monthly	10 - 130	25	15.5	No

Section 3 Surface Water Monitoring

Parameter	Limit of Reporting (LOR)	Licence Trigger Value	Monitoring Frequency	2022 Value Range	2022 Average	Long-term Average (2020 – 2022) ^	2022 Reportable Exceedances* *
Nickel (µg/L) (dissolved)	1	70	Monthly	6 – 120	27.2	16.46	No
Selenium (µg/L) (total)	1	3	Monthly	<1 – <50	23.1	12.62	Yes
Selenium (µg/L) (dissolved)	1	3	Monthly	<1 – <10	4.7	3.42	Yes
Vanadium (µg/L) (total)	5	100	Monthly	<5 – <50	27.6	19.16	No
Vanadium (µg/L) (dissolved)	5	100	Monthly	<5 – <50	23	16.86	No
Zinc (µg/L) (total)	5	15	Monthly	170 – 8,900	3,501	1907.82	Yes
Zinc (µg/L) (dissolved)	5	15	Monthly	140 – 6,500	28,920	1497.8	Yes
Hydrocarbons							
BTEXN (µg/L)	1	700 (benzene) 180 (toluene) 70 (naphthalene)	Monthly	<1 – <100	80.6	76.1	No
	1			<1 – <100	80.6	76.1	No
	10			<10 – <1000	806	512.25	Yes
PAHs (µg/L)	1	-	Monthly	<1 – 4	1.33	2.57	-
TRH (µg/L)	100	-	Monthly	<100 – 44,900	6,580	3,471.5	-
Organic Alcohols							
Monoethylene Glycol (ug/L)	20,000	-	Monthly	<20,000 – 8,500,000	1,022,500	521,250	-
Triethylene Glycol (ug/L)	20,000	-	Monthly	<20,000	<20,000	20,000	-
Other							
PFAS (µg/L)	0.01	0.13 (PFOS) 220 (PFAS)	Monthly	<0.01 – <50	5.218	2.63	Yes
	0.1			0.24 – 2.1	0.80	0.83	No
Polychlorinated Biphenyls (ug/L)	5	-	Monthly	0 – <5	4.5	2.68	-
Total Cyanide (µg/L)	5	4	Monthly	<5 – <10	7.5	6.75	Yes
Total Halogenated Phenol (µg/L)	10	400	Monthly	<10	10	8.75	Yes

Section 3 Surface Water Monitoring

Parameter	Limit of Reporting (LOR)	Licence Trigger Value	Monitoring Frequency	2022 Value Range	2022 Average	Long-term Average (2020 – 2022) ^	2022 Reportable Exceedances* *
Total Non-halogenated Phenol (µg/L)	100	400	Monthly	<100 – 6,970	1,161.67	581.27	Yes
TSS (mg/L)	5	10	Monthly	7.6 – 37	23.47	19.52	Yes
TDS (mg/L)	10	-	Monthly	64 – 3,300	643.4	418.49	-

*Limited accuracy – four monitoring dates did not collect in-situ data.

^Long term average based on reporting period 2020/2021 onwards as significant portions data was missing from preceding reporting periods (2018/2019 and 2019/2020) and reliable averages were unable to be calculated.

**Reportable exceedances include an exceedance of a trigger value on three consecutive occasions (and all subsequent consecutive occasions) and/or an exceedance on a single occasion where the parameter measures greater than or equal to three times the trigger value.

Note: Where concentration results preceded by '<' have been identified in the data, these values have been conservatively assumed to represent the upper limit of the value (e.g. <100 µg/L represents 100 µg/L). These assumed values have been used to determine averages in the above table and to depict the data in the graphs below.

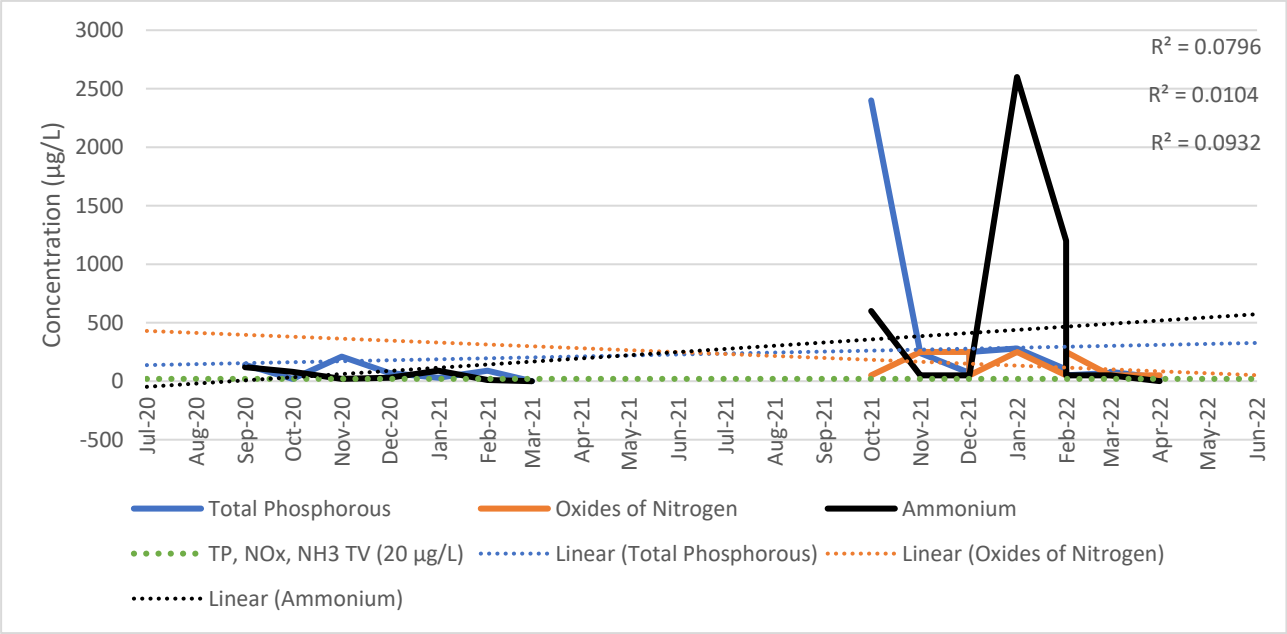


Figure 24 Total Phosphorus, Oxides of Nitrogen and Ammonium Concentrations

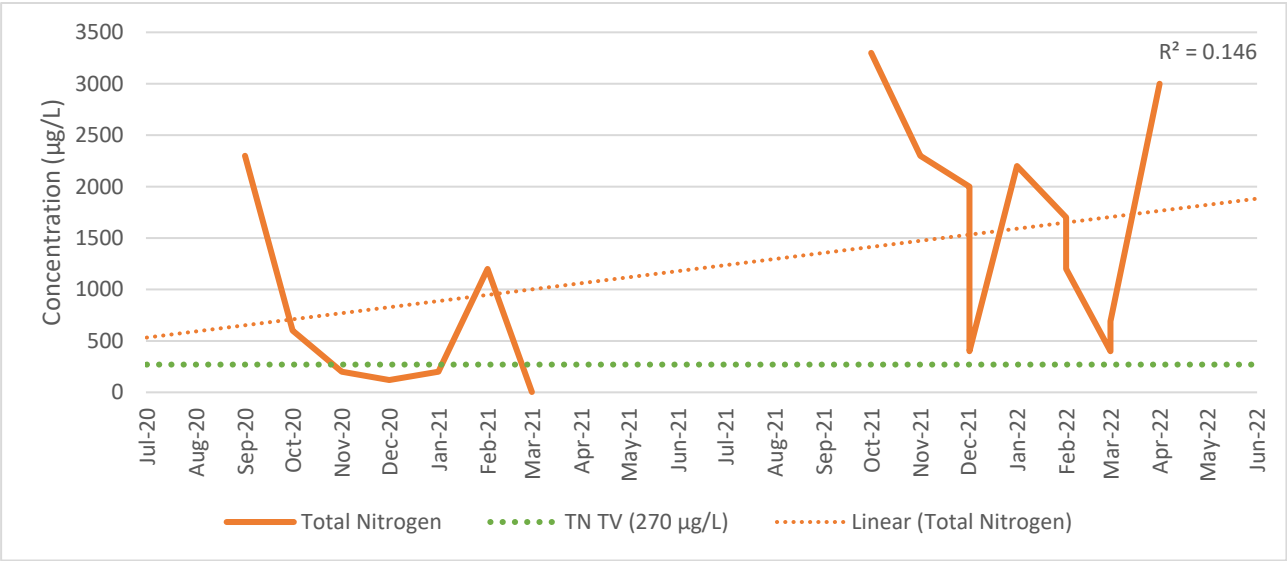


Figure 25 Total Nitrogen Concentrations

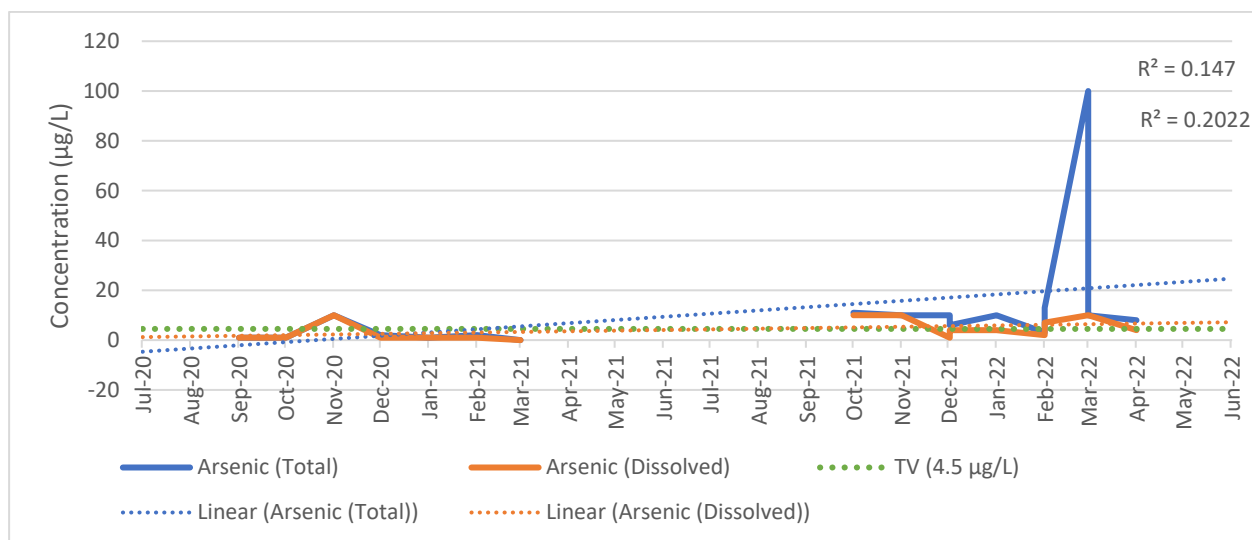


Figure 26 Arsenic Concentrations

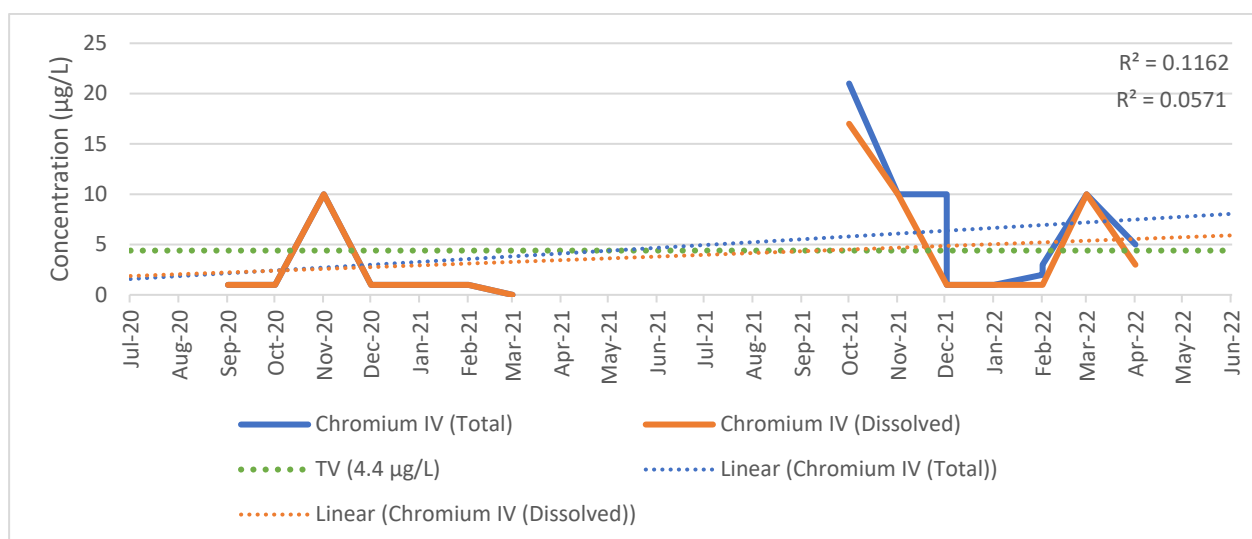


Figure 27 Chromium IV Concentrations

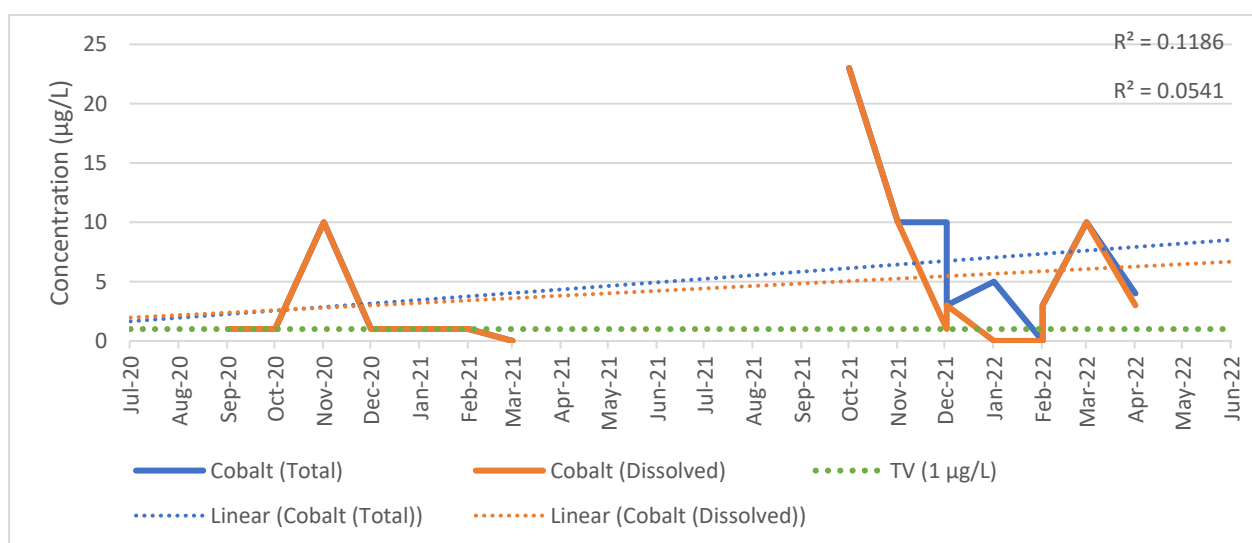


Figure 28 Cobalt Concentrations

Section 3 Surface Water Monitoring

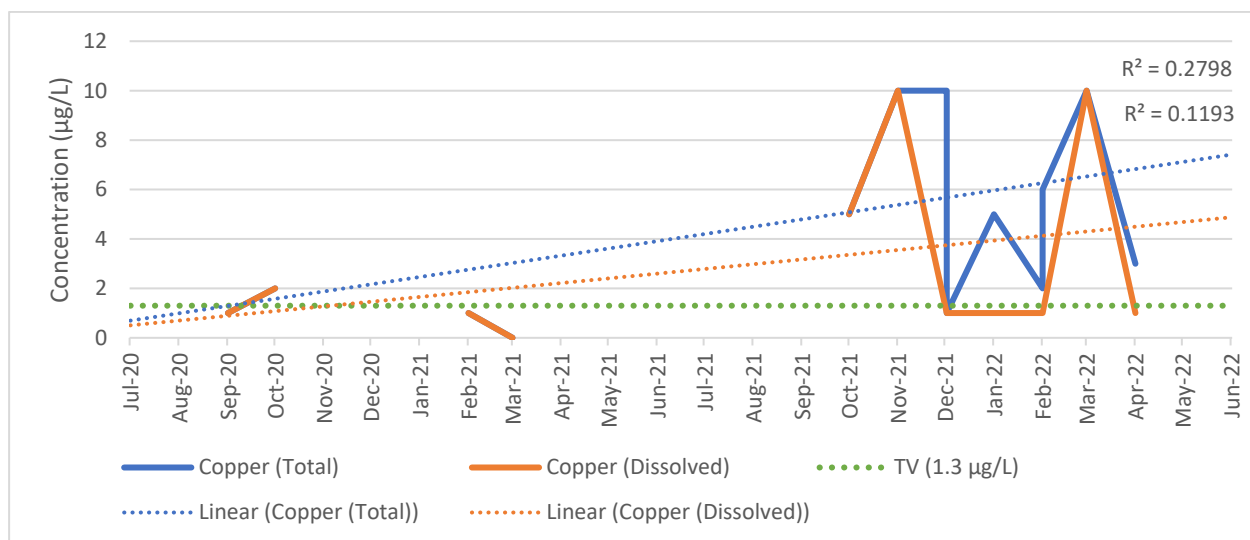


Figure 29 Copper Concentrations

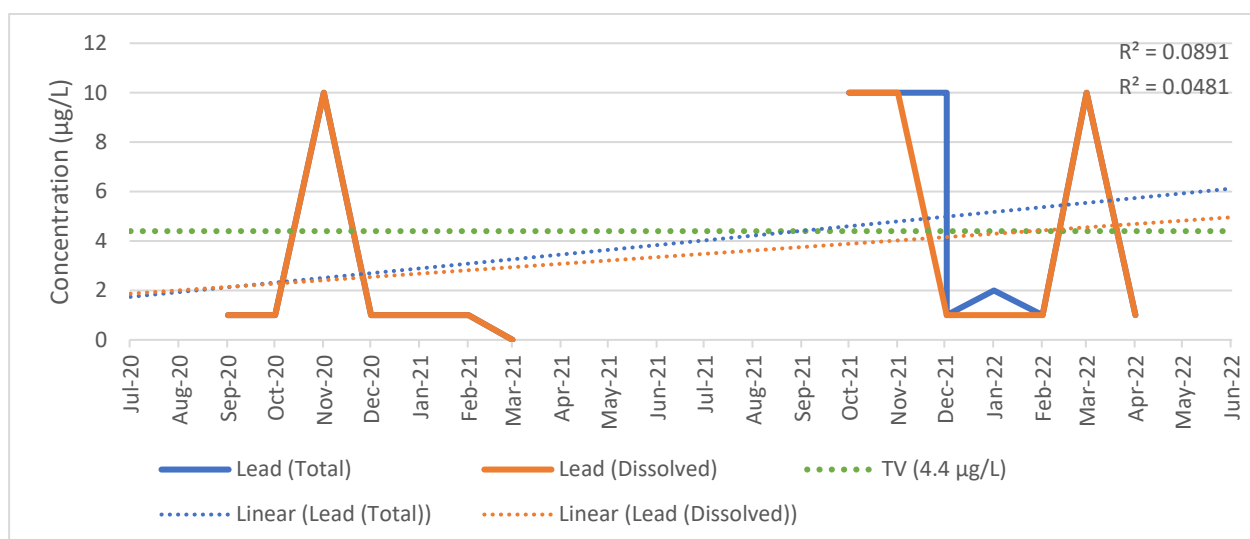


Figure 30 Lead Concentrations

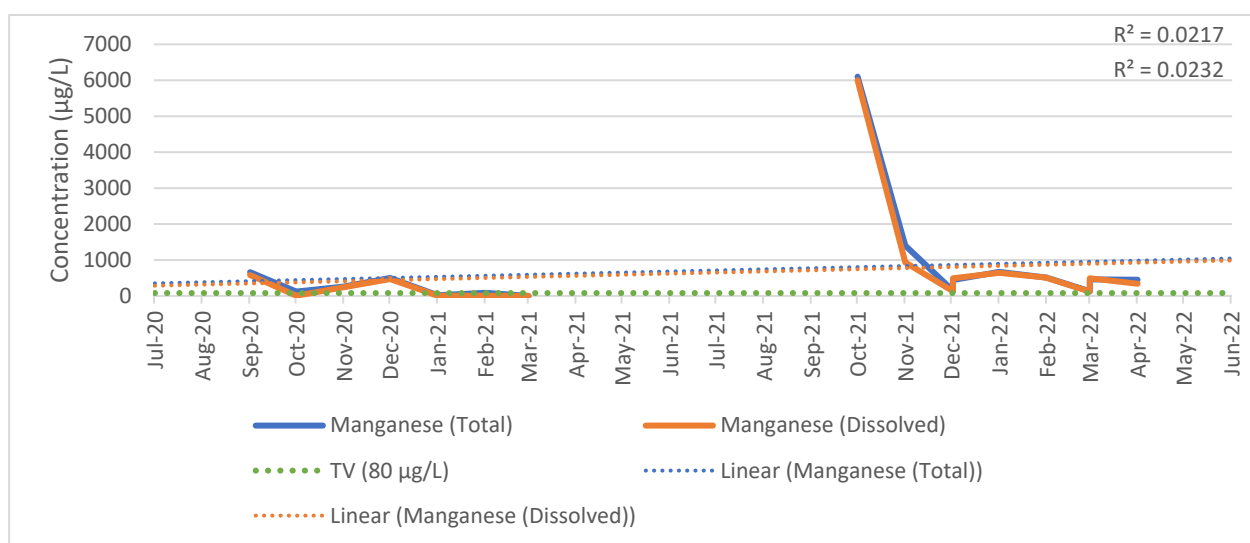


Figure 31 Manganese Concentrations

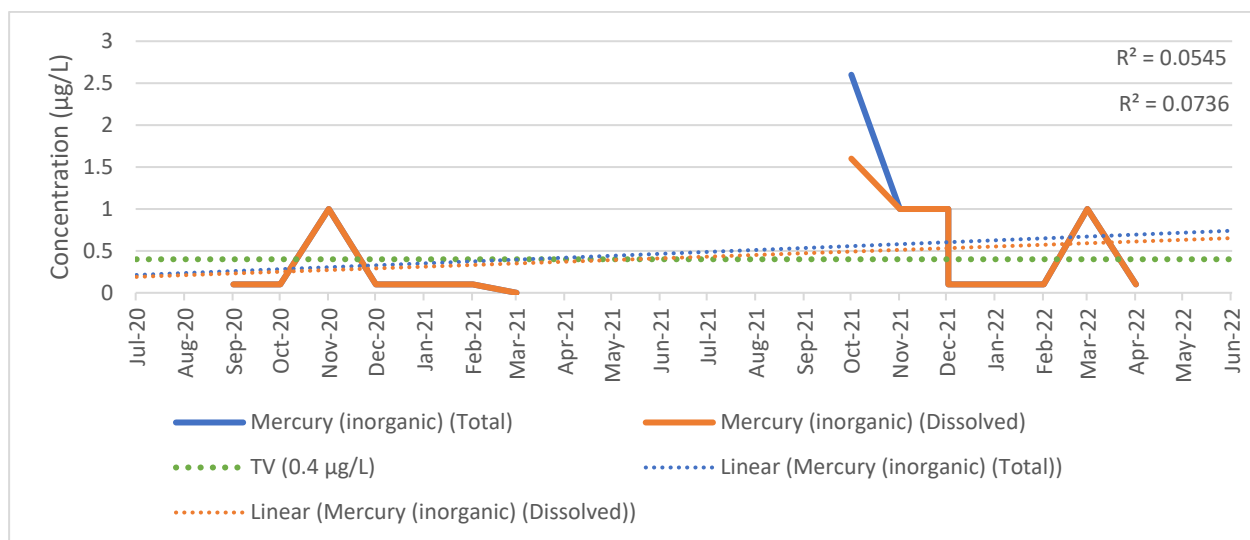


Figure 32 Mercury (inorganic) Concentrations

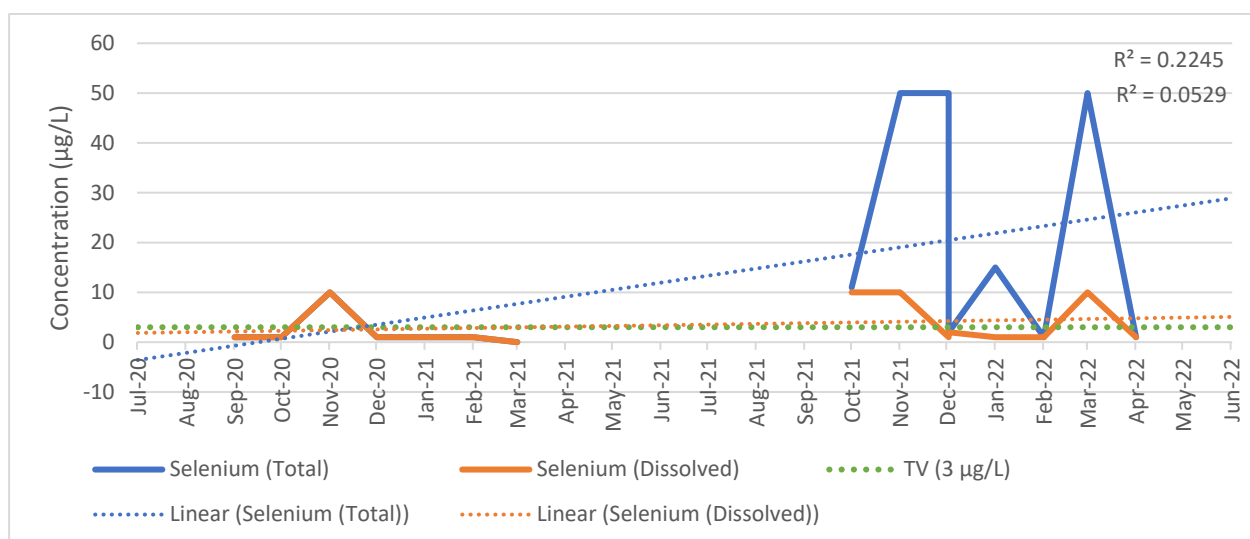


Figure 33 Selenium Concentrations

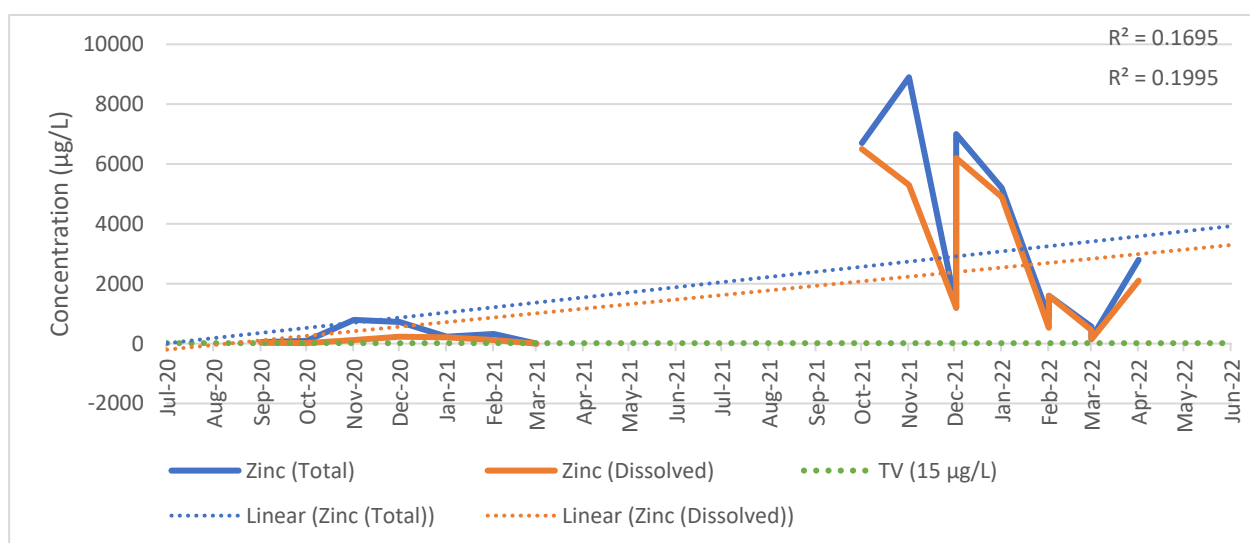


Figure 34 Zinc Concentrations

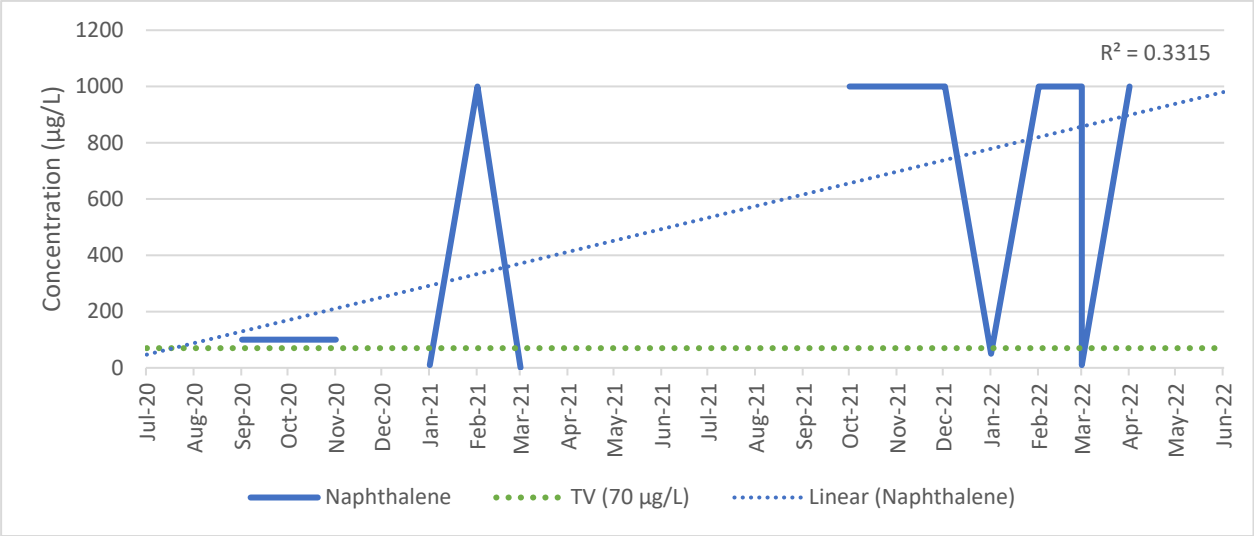


Figure 35 Naphthalene Concentrations

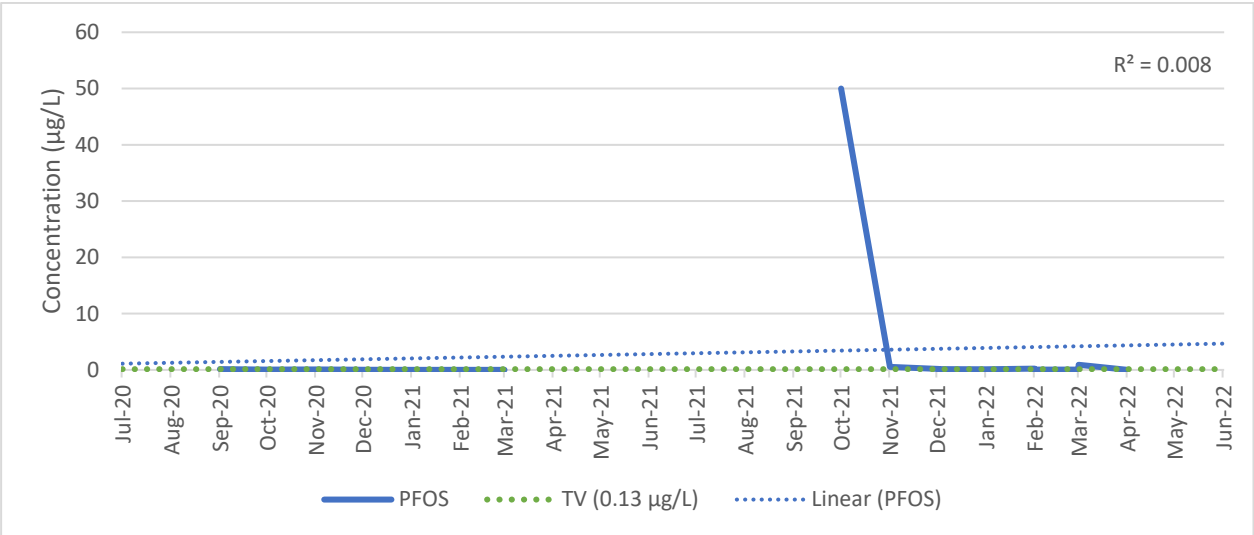


Figure 36 PFOS Concentrations

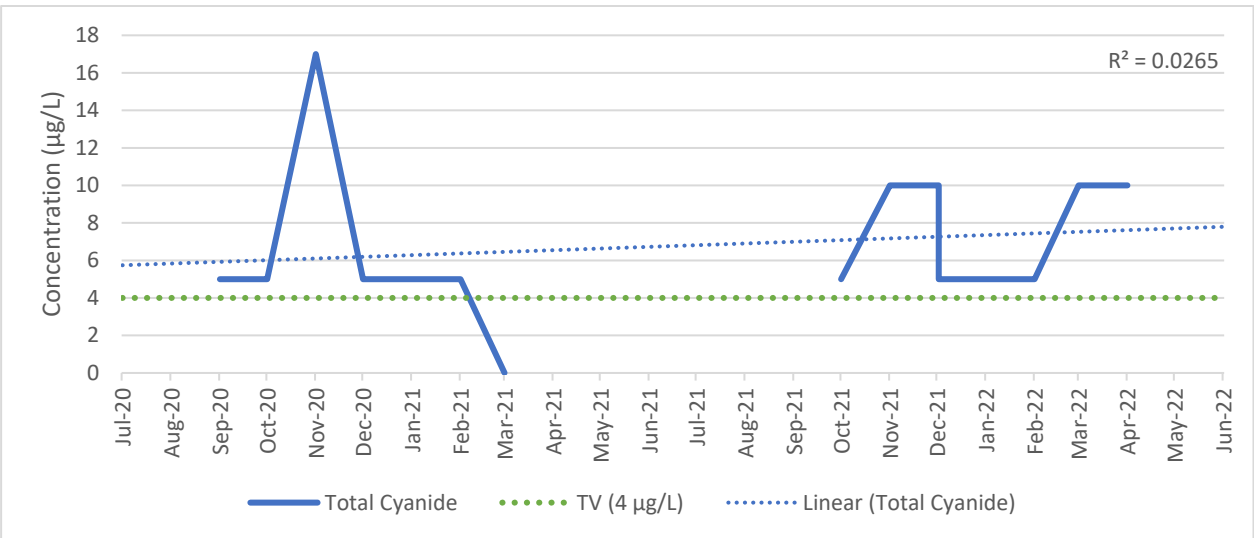


Figure 37 Total Cyanide Concentrations

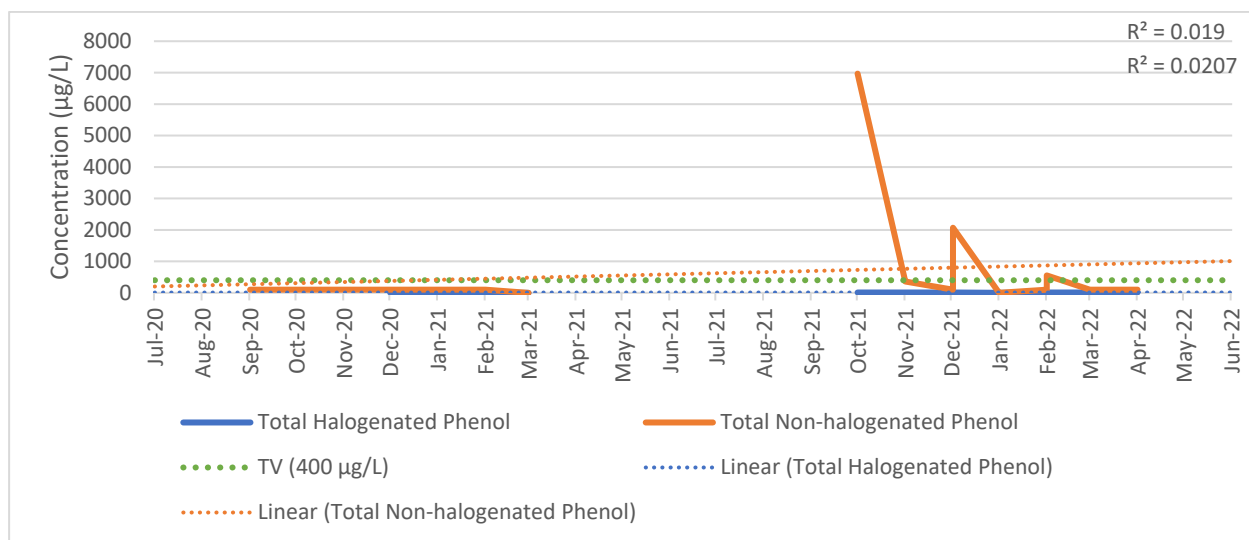


Figure 38 Phenol Concentrations

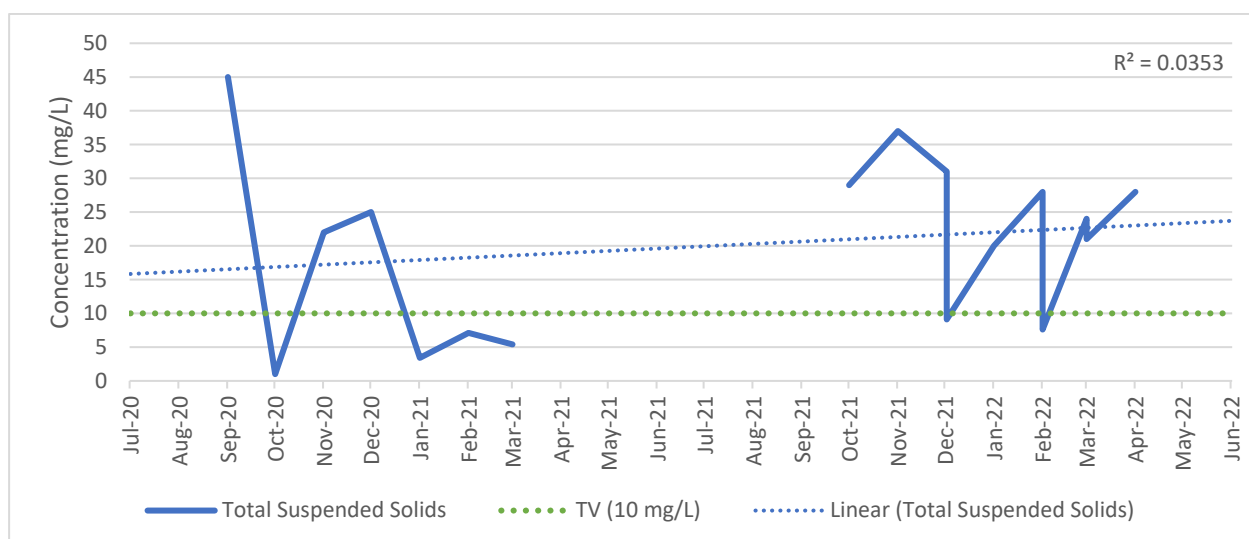


Figure 39 Total Suspended Solids Concentrations

3.5 Compliance with Licence Conditions and Discussion

As per Clause 41 of EPL 299-01, the licensee must conduct surface water monitoring in accordance with Attachment A. Based on this clause, there are no non-compliances.

Trends could not be determined for reported surface water concentrations due to limited datasets.

For in-situ parameters during the reporting period, the 2022 average results were generally aligned with the long-term average, except for EC. As the data in the long-term average is only utilised from the 2020/2021 and 2021/2022 reporting periods, the averages are expected to evolve and come into further alignment as more data is included. GRR is in development of a semi-automated database which will assist in capturing trigger value exceedances in line with the current EPL 229-01 trigger values.

It was noted in the GRR EPL 229-01 compliance audit that guideline values from the ANZG and WQO were never intended to be trigger values for any point source discharge, but rather are intended as guidelines for the quality of the water body as a whole. As a result, the trigger values for point sources need to recognise the tiny relative

Section 3 Surface Water Monitoring

contribution of a site the size of the GRR facility to the volume of water in the Darwin Harbour and can safely allow for a significant increase in trigger values from any individual source.

The pH exceedance was reported to the NT EPA on 8 February 2022. Due to resourcing and the ongoing system improvements to the GRR reporting process, the other exceedances were not reported to NT EPA as per Condition 63.

Section 4 Air Quality Monitoring

Environmental monitoring of air quality is a requirement under the EPL 229-01 in accordance with Attachment C. The programme typically consists of a single round of air sampling undertaken at two locations annually. Sample locations are AEP1 (gas fired boiler stack) and AEP 2 (combined vent scrubber stack). Sampling was conducted by Assured Environmental on 27th and 28th April 2022. summary of the air quality monitoring locations and analytical suite is presented in Table 4-1

Specific details on the methodologies implemented for each AQME are described within the individual monitoring report attached as Appendix I.

Table 4-1 Air quality monitoring program 2021-2022

Sample ID	Location	Contaminants of Potential Concern (CoPC)	Comment
AEP1	Boiler	Flue gas temperature Flue gas velocity Oxygen Carbon dioxide Water vapour content Total solid particulates Sulphur dioxide Oxides of nitrogen (as NO ₂) Carbon monoxide Total VOCs Hydrogen chloride Heavy metals	Sample location is compliant but non ideal as per AS4323.1. The sample location is greater than two, but less than six diameters downstream from a disturbance. The temperature and velocity survey showed that the sample position was in compliance to items (a) to (f) as per AS4323.1.
AEP2	Vent Stack	Flue gas temperature Flue gas velocity Oxygen Carbon dioxide Water vapour content Total solid particulates Sulphur dioxide Oxides of nitrogen (as NO ₂) Carbon monoxide Total VOCs Hydrogen chloride Heavy metals	Sample location is non-compliant, the gas flow is below the limit of detection. The instrumentation was unable to detect the differential pressure within the duct, therefore the results have been reported at the detection limit, which is considered a conservative result.

4.1 Air Quality Sampling Methodology

All sampling and analysis was carried out in accordance with the listed requirements in Table 4-2. Any specific comments about the sampling and analysis have been documented where required.

The sampling equipment was transported to the site and set up at the test locations. Sampling was performed using heated probes and filters, with a constant flow and isokinetic sample console.

Table 4-2 Test Methods

Parameter	Reference Test Method	Test Method (NSW)
Sample location	AS4323.1	TM-1
Velocity & flow rate	USEPA Method 2	TM-2
Stack gas density	USEPA Method 3	TM-23
Oxygen	USEPA Method 3A	TM-25
Carbon dioxide	USEPA Method 3A	TM-24
Water vapour content	USEPA Method 4	TM-22
Total solid particulates	AS 4323.2	TM-15
Sulphur dioxide	USEPA Method 6C	TM-4
Oxides of nitrogen (as NO ₂)	USEPA Method 7E	TM-11
Carbon monoxide	USEPA Method 10	TM-32
Volatile organic compounds	USEPA Method 18	TM-34
Hydrogen chloride	USEPA Method 26A	TM-8
Heavy metals	USEPA Method 29	TM-12/13/14

4.2 Air Quality assessment criteria

The EMP and EPL 229-01 prescribes air quality assessment criteria to determine the acceptability and investigation limits of individual analytes in the air that is discharged to the atmosphere. Where exceedances to these criteria are reported from field measurements or laboratory results, a EPL 229-01 requires notification of these exceedances to NT EPA in accordance with EPL Clause 34.

These acceptance criteria have been summarised in Table 4-3.

Table 4-3 EPL 229-01 Air Quality acceptance criteria values

Parameter	Units	Acceptance Limit (EPL 229-01 Attachment C)
Solid Particles (total)	mg/Nm ³	50
Oxides of Nitrogen	mg/Nm ³	350
Hydrogen Chloride	mg/Nm ³	100
Cadmium	mg/Nm ³	0.2
Carbon Monoxide	mg/Nm ³	125
Mercury	mg/Nm ³	0.2
Heavy Metals	mg/Nm ³	1
Sulfur Dioxide	mg/Nm ³	150
VOCs	mg/Nm ³	40

4.3 Quality Assurance/Quality Control

AE operates within a quality system based upon the requirements of ISO17025. The overall objective of our QA/QC procedures is to representatively sample and accurately analyse components in the gas streams and therefore report valid measurements of emission concentrations.

To ensure representativeness of field work, our quality procedures target:

1. Correct sampling locations
2. Sample time
3. Frequency of samples and
4. Method selection & adherence

To ensure representativeness of lab work, our quality procedures target:

1. Sample preservation
2. Chain of custody (COC)
3. Sample preparation and
4. Analytical techniques

QA/QC checks for this project will use validation techniques and criteria appropriate to the type of data and the purpose of the measurement to approve the test report. Records of all data will be maintained. Complete chain of custody (COC) procedures have been followed to document the entire custodial history of each sample. The COC forms also served as a laboratory sheet detailing sample ID and analysis requirements.

4.4 Air Quality Monitoring Results

Stack emission results are compared to EPL229-01 trigger values and presented in Table 4-4. A summary of results and comparison against compliance levels is presented in Table 4-4 and Table 4-5 below from the testing conducted on the boiler stack and combined vent scrubber stack release points. The process is understood to have been operating at a stable and representative load for the duration of the monitoring.

In comparison to the emission limits, all measured parameters were within those limits specified. Results are reported at dry, 273.15°K and 101.325 kPa (STP).

Table 4-4 Air Quality Results - Boiler

Parameter	Units	Acceptance Limit (EPL 229-01 Attachment C)	Test 1 Boiler Stack	Test 2 Boiler Stack
Solid Particles (total)	mg/Nm ³	50	<1.4	<1.5
Oxides of Nitrogen	mg/Nm ³	350	25	25
Hydrogen Chloride	mg/Nm ³	100	<0.7	<0.8
Cadmium	mg/Nm ³	0.2	0.0021	0.00044
Carbon Monoxide	mg/Nm ³	125	11	11
Mercury	mg/Nm ³	0.2	0.000069	0.000044
Heavy Metals	mg/Nm ³	1	<0.051	<0.041
Sulfur Dioxide	mg/Nm ³	150	<3	<3
VOCs	mg/Nm ³	40	<0.8	<0.8

Table 4-5 Air Quality Results – Scrubber Vent

Parameter	Units	Acceptance Limit (EPL 229-01 Attachment C)	Test 1 Vent Stack	Test 2 Vent Stack
VOCs	mg/Nm ³	40	<1.1	<1.2

4.5 Compliance with Licence Conditions and Discussion

As per Clause 43 of EPL229-01, the licensee must conduct stack emissions monitoring in accordance with Attachment C. Based on this clause GRR are compliant.

It is understood that the plant only recently became operational and therefore the occurrence of two annual stack emission monitoring event is considered compliant with the licence.

Stack emission monitoring trend analysis is to occur once the dataset has expanded.

Section 5 Conclusions and Recommendations

The groundwater and surface water monitoring and air quality monitoring undertaken during this annual reporting period has met the requirements of the EPL 229-01. The results from this annual reporting period indicate that activities being undertaken on the GRR site do not pose a risk to the surrounding environment. Although the surrounding environment exhibits minimal to no impact from the site activities, groundwater and air quality monitoring will continue to be undertaken as per NT EPA requirements.

It is recommended that the groundwater analytical dataset be reviewed and assessed to determine whether the recorded exceedances are a trend or represent naturally occurring background concentrations (e.g., copper, nickel and zinc). The outcome of this assessment should be considered when evaluating the suitability of the current acceptance criteria.

It was noted in the GRR EPL 229-01 compliance audit that guideline values from the ANZG and WQO were never intended to be trigger values for any point source discharge, but rather are intended as guidelines for the quality of the water body as a whole. As a result, the trigger values for point sources need to recognise the tiny relative contribution of a site the size of the GRR facility to the volume of water in the Darwin Harbour and can safely allow for a significant increase in trigger values from any individual source.

It is recommended in the recent GRR EPL229-01 compliance audit that the monitoring regime: remove requirement for monthly ground water height and measuring the field parameters. GRR facility has no direct impact to groundwater levels or parameters measured in the field results and capturing this data does not provide any relevant information. What is the real comparison of groundwater levels to tidal influences on this site? It is reclaimed land and as such the groundwater aquifer has already been discreetly compromised.

The boiler that is being tested is a standard natural gas boiler, operating on natural gas to make process steam. It is recommended that as the site is still in its infancy of operations that another annual monitoring event take place to get a solid baseline of yearly data to inform if the boiler requires further emissions testing. As it stands the current results from the last two years indicates that the boiler is well maintained and operates well within the expected parameter for a natural gas boiler.

It is recommended that where the Limit of Reporting is greater than the licence trigger value, in which the trigger values should be adjusted to site specific and raised to better suite the site and the sites environmental conditions. The trigger values are unachievably low values, that have been taken from the ANZG and need to be modified as they are out of context.

Section 6 Disclaimer and Limitations

This report has been prepared by CDM Smith Australia Pty Ltd (CDM Smith) for the sole benefit of GRR for the sole purpose of informing the outcomes of the Global Resource Recovery Plant Annual Monitoring Report.

This report should not be used or relied upon for any other purpose without CDM Smith's prior written consent. Neither CDM Smith, nor any officer or employee of CDM Smith, accepts responsibility or liability in any way whatsoever for the use of or reliance on this report for any purpose other than that for which it has been prepared.

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If further information becomes available, or additional assumptions need to be made, CDM Smith reserves its right to amend this report.

Appendix A EPL 229-01

ENVIRONMENT PROTECTION LICENCE

(Pursuant to section 34 of the *Waste Management and Pollution Control Act*)

Licensee	Smorgon Fuels Pty Ltd
Licence Number	EPL229 - 02
Registered Business Address	Smorgon Fuels Pty Ltd 644 Chapel Street South Yarra VIC 3141
ACN	094 541 723
ABN	84 094 541 723
Premises Address	Section 05783 Hundred of Bagot plan(s) S2005/171A 800 BERRIMAH RD, EAST ARM
Anniversary Date:	29 June
Commencement Date:	29/06/2022
Expiry Date:	28/06/2027
Scheduled Activity	Collecting, transporting, storing, re-cycling, treating or disposing of a listed waste (as per Table 1) on a commercial or fee for service basis, other than in or for the purpose of a sewage treatment plant. Operating premises, other than a sewage treatment plant, associated with collecting, transporting, storing, re-cycling, treating or disposing of a listed waste (as per Table 1) on a commercial or fee for service basis.
Description	Operation of a liquid waste treatment facility capable of treating, storing and recycling a variety of industrial liquid waste including the treatment of waste water and the recycling of ethylene glycol for the maritime, mining and oil and gas industries in the Darwin region.

Table 1 - Listed Wastes Authorised to be Handled

Listed Waste	Collection	Transport	Storage	Treatment	Recycling	Disposal
Antimony, antimony compounds	✗	✗	✓	✓	✗	✗
Arsenic, arsenic compounds	✗	✗	✓	✓	✗	✗
Barium compounds other than barium sulphate	✗	✗	✓	✓	✗	✗
Basic solutions or bases in solid form	✗	✗	✓	✓	✓	✗
Beryllium, beryllium compounds	✗	✗	✓	✓	✗	✗
Boron compounds	✗	✗	✓	✓	✗	✗
Cadmium, cadmium compounds	✗	✗	✓	✓	✗	✗
Chlorates	✗	✗	✓	✓	✗	✗
Acidic solutions or acids in solid form	✗	✗	✓	✓	✓	✗
Chromium compounds that are hexavalent or trivalent	✗	✗	✓	✓	✗	✗
Cobalt compounds	✗	✗	✓	✓	✗	✗
Containers that are contaminated with residues of a listed waste	✗	✗	✓	✓	✗	✗
Copper compounds	✗	✗	✓	✓	✗	✗
Cyanides (inorganic)	✗	✗	✓	✓	✗	✗
Encapsulated, chemically fixed, solidified or polymerised wastes	✗	✗	✓	✓	✗	✗
Ethers	✗	✗	✓	✗	✗	✗
Filter cake	✗	✗	✓	✗	✗	✗
Fire debris and fire washwaters	✗	✗	✓	✓	✗	✗
Fly ash	✗	✗	✓	✓	✗	✗
Halogenated organic solvents	✗	✗	✓	✗	✗	✗

ENVIRONMENT PROTECTION LICENCE 229 - 02

Listed Waste	Collection	Transport	Storage	Treatment	Recycling	Disposal
Highly odorous organic chemicals (including mercaptans and acrylates)	✗	✗	✓	✗	✗	✗
Inorganic fluorine compounds excluding calcium fluoride	✗	✗	✓	✓	✗	✗
Inorganic sulfides	✗	✗	✓	✓	✗	✗
Isocyanate compounds	✗	✗	✓	✗	✗	✗
Lead, lead compounds	✗	✗	✓	✓	✗	✗
Mercury, mercury compounds	✗	✗	✓	✓	✗	✗
Nickel compounds	✗	✗	✓	✓	✗	✗
Non-toxic salts	✗	✗	✓	✓	✗	✗
Organic phosphorus compounds	✗	✗	✓	✗	✗	✗
Organic solvents excluding halogenated solvents	✗	✗	✓	✓	✓	✗
Organohalogen compounds that are not otherwise specified in this Schedule	✗	✗	✓	✗	✗	✗
Perchlorates	✗	✗	✓	✗	✗	✗
Phenols, phenol compounds including chlorophenols	✗	✗	✓	✗	✗	✗
Phosphorus compounds other than mineral phosphates	✗	✗	✓	✓	✗	✗
Residue from industrial waste treatment or disposal operations	✗	✗	✓	✓	✗	✗
Selenium, selenium compounds	✗	✗	✓	✓	✗	✗
Soils contaminated with a listed waste	✗	✗	✓	✗	✗	✗
Surface active agents (surfactants) that contain principally organic constituents and that may contain metals and inorganic materials	✗	✗	✓	✓	✗	✗
Vanadium compounds	✗	✗	✓	✓	✗	✗
Waste chemical substances arising from R&D or teaching activities where the effects on human health and/or the environment are not known	✗	✗	✓	✓	✗	✗
Wastes containing peroxides other than hydrogen peroxide	✗	✗	✓	✓	✗	✗

ENVIRONMENT PROTECTION LICENCE 229 - 02

Listed Waste	Collection	Transport	Storage	Treatment	Recycling	Disposal
Waste containing cyanides from heat treatment and tempering operations	✗	✗	✓	✗	✗	✗
Waste from the production, formulation and use of biocides and phytopharmaceuticals	✗	✗	✓	✓	✗	✗
Waste from the production, formulation and use of inks, dyes, pigments, paints, lacquers and varnish	✗	✗	✓	✓	✗	✗
Waste from the production, formulation and use of organic solvents	✗	✗	✓	✓	✓	✗
Waste from the production, formulation and use of photographic chemicals and processing materials	✗	✗	✓	✓	✗	✗
Waste from the production, formulation and use of resins, latex, plasticisers, glues and adhesives	✗	✗	✓	✓	✗	✗
Waste from the production and preparation of pharmaceutical products	✗	✗	✓	✓	✗	✗
Waste mineral oils unfit for their original intended use	✗	✗	✓	✓	✓	✗
Waste mixtures, or waste emulsions, of oil and water or hydrocarbon and water	✗	✗	✓	✓	✓	✗
Waste pharmaceuticals, waste drugs and waste medicines	✗	✗	✓	✗	✗	✗
Waste resulting from surface treatment of metals and plastics	✗	✗	✓	✓	✗	✗
Waste tarry residues arising from refining, distillation and any pyrolytic treatment	✗	✗	✓	✗	✗	✗
Waste substances and articles containing or contaminated with PCBs, PCNs, PCTs and/or PBBs	✗	✗	✓	✗	✗	✗
Zinc compounds	✗	✗	✓	✓	✗	✗

✓ Activity authorised by this licence

✗ Activity not authorised by this licence

ENVIRONMENT PROTECTION LICENCE 229 - 02

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ATTACHMENTS

- 1 Attachment A - Surface Water Monitoring.pdf
- 2 Attachment B - Groundwater Monitoring.pdf
- 3 Attachment C - Stack Emission Monitoring.pdf

ENVIRONMENT PROTECTION LICENCE 229 - 02

INFORMATION ABOUT THIS LICENCE

- This licence does not in any way relieve the licence holder from its obligations to comply with the *Waste Management and Pollution Control Act* (WMPC Act), including the general environmental duty in section 12 of the WMPC Act and the duty to notify of incidents causing or threatening to cause pollution under section 14 of the WMPC Act.

Duration of a licence (section 40, 43 and 45 of the WMPC Act)

- A licence will remain in force until its expiry date or until it is surrendered by the licensee or is suspended or cancelled in accordance with the WMPC Act.
- The licensee must notify the Northern Territory Environment Protection Authority (NT EPA) within 14 days after ceasing to conduct the activity.
- The licensee may, with the approval of the NT EPA, surrender the licence to the NT EPA.

Amendment or Revocation of a licence (section 37 of the WMPC Act)

- The licensee may apply to amend or revoke a condition of this licence.
- A fee applies and the application must be made using the designated form via NT EPA Online.
- The NT EPA may also amend or revoke a condition of this licence as set out in section 38 of the WMPC Act.

Transfer of a licence (section 46 of the WMPC Act)

- The licensee can apply to transfer their licence to another person.

Renewal of a licence (section 40 of the WMPC Act and section 3 of the Regulations)

- The licensee may apply for the renewal of their licence not earlier than 90 days, and not later than 30 days, before their licence expires.
- A fee applies and the application must be made via NT EPA Online.

Public Register

- A copy of environment protection licences and any plans for environmental management, reports, submissions or documents required as a condition of an environment protection licence, will be placed on a register in accordance with section 9 of the WMPC Act.
- A copy of the Annual Return will be placed on the register.
- The NT EPA makes this register freely available from the NT EPA website.

Environment Protection Objectives (Part 4 of the WMPC Act), and Water Quality Standards (section 73 of the *Water Act*)

- An Environment Protection Objective (EPO) is a statutory instrument to establish principles on which:
 - a. environmental quality is to be maintained, enhanced, managed or protected;
 - b. pollution, or environmental harm resulting from pollution, is to be assessed, prevented, reduced, controlled, rectified or cleaned up; and
 - c. effective waste management is to be implemented or evaluated.
- In accordance with section 18 of the WMPC Act a beneficial use, quality standard, criteria or objective declared under section 73 of the *Water Act* and in force is an environment protection objective for the purposes of the WMPC Act.

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- The following EPOs and Beneficial Use Declarations (BUDs) are relevant to this licence:
 - Declaration of Beneficial Uses and Objectives Darwin Harbour Region - surface water

Environmental Interests

- This section highlights sensitivity of the surrounding land use and environment associated with the location of the approved activity.
- Sites of Conservation Significance (SOCS) - Darwin Harbour Region. SOCS number 6
- Ramsar Wetland - none

Cultural Interests

- It is the licensee's responsibility to contact the Aboriginal Areas Protection Authority, appropriate land council or other governing body and ensure that any Authority Certificates required as a result of conducting the licenced activity are obtained and complied with.

ENVIRONMENT PROTECTION LICENCE 229 - 02

RULES FOR INTERPRETING THE CONDITIONS OF THIS LICENCE

- Where there is a discrepancy between the conditions of this licence and any plan, standard, guideline or other document referred to in this licence, the conditions of this licence prevail to the extent of the inconsistency.
- Any reference to any standard (Australian or international) in this licence means the relevant parts of the current version of that standard.
- A reference to any guideline or code of practice (or to the relevant parts of any guideline or code of practice) in this licence means the current version of the guideline or code of practice.
- Under section 39 of the WMPC Act, any contravention of or failure to comply with this licence by the licensee may be an offence.
- In determining whether the licensee has committed an offence, the licensee may be liable for the conduct of its directors, employees or agents.
- The licensee should ensure that each of its directors, employees, contractors or agents are aware of, and comply with, this licence.
- In this licence, unless the contrary intention appears, words that are defined in the WMPC Act are intended to have the meaning given to them in that Act.

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LICENCE CONDITIONS

GENERAL

- 1 The licensee must ensure the contact details recorded in NT EPA Online for this licence are correct at all times.
- 2 The licensee must at all times have a 24 hour emergency contact.
- 3 The licensee must pay the annual fee calculated in accordance with the method prescribed in the Regulations within 50 business days of the anniversary of the commencement date of this licence, for each year or part of a year that this licence is in force.
- 4 The licensee must cause clear and legible signage, in English, to be displayed in a prominent location at each public entrance to the premises that includes the following details:
 - 4.1 environment protection licence number issued under the WMPC Act; and
 - 4.2 24 hour emergency contact details.
- 5 The licensee must cause a copy of this licence to be available for inspection by any person, in hard copy form, at the premises.
- 6 The licensee must ensure, at all times, that the activity is covered by a policy of insurance or other form of indemnity that will cover the likely costs or preventing, minimising or making good environmental damage that may result from the activity.
- 7 The licensee must provide to the NT EPA, within 10 business days of a request, a copy of any document, monitoring data or other information in relation to the activity, in the format requested by the NT EPA.
- 8 All notices, reports, documents or other correspondence required to be provided as a condition of this licence, unless otherwise specified as a condition of this licence, must be provided in electronic form by uploading the document via NT EPA Online (or by emailing waste@nt.gov.au).
- 9 The licensee must maintain and implement the documents listed in Table 2.

Table 2 - Documents relating to this licence

Document Ref.	Document Name
GRR-DRW-FOR-210	Environmental Management Plan
Revision H	Emergency Response Plan
GRR-DRW-PRO-401-R2	Bulk Truck Receival
GRR-DRW-PRO-301 Rev 2	Pre-acceptance Sampling
GRR-DRW-PRO-402-R2	Bulk Wastewater Unloading
GRR-DRW-PRO-403-R2	Packaged Waste Receival

- 10 Within 10 business days of any amendment being made to a document listed in Table 2 the licensee must provide the amended document to the NT EPA, along with:
 - 10.1 a tabulated summary of the amendment(s) with document references;
 - 10.2 reasons for the amendment(s); and
 - 10.3 an assessment of environmental risk associated with the amendment(s).

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- 11 The NT EPA may require the licensee to revise or amend and resubmit any amended document. Where the NT EPA requires a document to be resubmitted, the licensee must submit it to the NT EPA by the date specified by the NT EPA.
- 12 The licensee must maintain a Complaint Log for all complaints received by the licensee in relation to the activity.
- 13 The licensee must ensure that the Complaint Log includes, for each complaint received by the licensee, the following information:
- 13.1 the person to whom the complaint was made;
 - 13.2 the person responsible for managing the complaint;
 - 13.3 the date and time the complaint was reported;
 - 13.4 the date and time of the event(s) that led to the complaint;
 - 13.5 the contact details of the complainant if known, or where no details are provided a note to that effect;
 - 13.6 the nature of the complaint;
 - 13.7 the nature of event(s) giving rise to the complaint;
 - 13.8 prevailing weather conditions at the time (where relevant to the complaint)
 - 13.9 the action taken in relation to the complaint, including any follow-up contact with the complainant; and
 - 13.10 if no action was taken, why no action was taken.
- 14 The licensee must implement, maintain and follow an Emergency Response Plan that addresses procedures for responding to emergencies associated with the activity that may cause environmental harm.

EARLY SURRENDER OF LICENCE

- 15 Any reports, records or other information required or able to be provided by the licensee under this licence must be submitted to the NT EPA prior to the licensee surrendering the licence. If the date on which a report, record or other information is required falls after the date the licensee requests to surrender this license, the licensee must provide the report, record or information as far as possible using data available to the licensee up to and including the date the request to surrender the licence is made.

OPERATIONAL

- 16 The licensee must, without limiting any other condition of this licence, in conducting the licenced activity, do all things reasonable and practicable to ensure the licenced activity does not adversely affect the relevant Declared Beneficial Uses and Objectives as declared from time to time, including those applying to:
- *Darwin Harbour Region - surface water - aquaculture, environment, cultural, rural stock and domestic*

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- 17 The licensee must not collect, transport, store, recycle, treat or dispose of listed waste other than the listed waste specified in Table 1.
- 18 The licensee must ensure any plant and equipment used by the licensee in conducting the activity:
- 18.1 is reasonably fit for the purpose and use to which it is put;
 - 18.2 is maintained;
 - 18.3 is operated by a person trained to use the plant and equipment; and
 - 18.4 is operated by, or operated by a person accompanied by, a person trained to handle, store or dispose of listed waste in connection with the activity.
- 19 The licensee must ensure that wastewater generated from washing plant and equipment associated with the activity does not cause pollution.
- 20 The licensee must segregate waste received at the premises in clearly designated areas for recycling, re-use or disposal.
- 21 The licensee must ensure that all materials that are likely to cause environmental harm are handled and stored in areas with a containment system in accordance with the relevant Australian Standard. Where no relevant Australian Standard exists, the containment system must be sized to contain 110% of the volume of the largest container within the area.
- 22 No change, replacement or alteration of plant and equipment is permitted if the change, replacement or alteration increases the risk of environmental harm for the licenced activity, unless approved in writing by the NT EPA.
- 23 The licensee must ensure that all listed waste being transported to and from the premises is transported by a person licenced under section 30 of the WMPC Act to transport the listed waste.
- 24 The licensee must ensure that all listed waste is delivered to a premises licenced under section 30 of the WMPC Act to receive that listed waste.
- 25 The licensee must comply with the National Environment Protection (Movement of Controlled Wastes between States and Territories) Measure.

DISCHARGES AND EMISSIONS

- 26 The licensee must ensure there is no migration or overflow of a contaminant or waste, which causes or may cause environmental harm, beyond the boundary of the land on which the premises are located. (For the avoidance of doubt, this condition is not intended to authorise the discharge of a contaminant or waste to any land or water which discharge has not been specifically authorised by another condition of this licence).
- 27 The licensee must not allow a contaminant or waste, which causes or may cause environmental harm, to enter water.
- 28 The licensee must ensure that stormwater does not come into contact with a contaminant or waste, which causes or may cause environmental harm.

Discharges to water

- 29 This licence does not authorise the discharge of waste water resulting from the licenced activity through the storm water drain discharge point WMP1 identified in Attachment A.
- 30 The licensee must ensure that water discharged through the storm water drain at WMP1 identified in Attachment A, does not exceed the trigger values specified in Attachment A.

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- 31 The licensee must ensure that the water discharged through the storm water drain at WMP1 identified in Attachment A does not:
- 31.1 consist of water from any other source than stormwater. Where stormwater has collected within bunded areas, then water quality analysis must confirm the stormwater pH and dissolved oxygen values are within the ranges specified in Attachment A and does not contain the nutrients, metals and metalloids, hydrocarbons, organic alcohols and other contaminants listed in Attachment A;
 - 31.2 contain any floating debris, oil, grease, petroleum hydrocarbon sheen, scum, litter or other objectionable matter;
 - 31.3 cause or generate odours which would adversely affect the use of surrounding waters;
 - 31.4 cause algal blooms in the receiving water;
 - 31.5 cause visible change in the behaviour of fish or other aquatic organisms in the receiving water;
 - 31.6 cause mortality of fish or other aquatic organisms; or
 - 31.7 cause adverse impacts on plants.

Emissions to air

- 32 The licensee must ensure that the emissions from all emission events do not exceed the trigger values specified in Attachment C.
- 33 The licensee must install, operate and maintain pollution control equipment to minimise contaminants or waste in emissions to air.
- 34 The activity must not cause or release, beyond the boundary of the premises:
- 34.1 visible steam;
 - 34.2 smoke;
 - 34.3 offensive odour;
 - 34.4 dust or particulates; or
 - 34.5 noise which unreasonably interferes with or is likely to unreasonably interfere with the enjoyment of the area by persons who occupy a place within the area or are otherwise lawfully in the area.
- 35 The licensee must comply with the National Environment Protection (Air Toxics) Measure.

Environmental Audit

- 36 The licensee must undertake, annually, and as prescribed by the conditions of this licence, an environmental audit by a qualified person to evaluate the:
- 36.1 extent to which compliance has been achieved with this licence; and
 - 36.2 ability of management systems to manage waste and prevent environmental harm resulting from pollution.
- 37 The licensee must submit the proposed scope for the environmental audit no later than 20 business days prior to the proposed commencement date of the environmental audit (which must be specified when the proposed scope is submitted), to the NT EPA for review and approval.
- 38 The NT EPA may require the licensee to revise or amend and resubmit any proposed scope for an environmental audit. Where the NT EPA requires the environmental audit scope to be resubmitted, the licensee must submit it to the NT EPA by the date specified by the NT EPA.

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- 39 The licensee must ensure that each environmental audit:
- 39.1 is not commenced until written approval of the environmental audit scope is received from the NT EPA; and
 - 39.2 is undertaken in accordance with the approved scope.
- 40 The licensee must ensure that, for each environmental audit undertaken by the licensee:
- 40.1 a written report is prepared and signed by the qualified person who conducted the audit;
 - 40.2 the written report is completed within 2 calendar months of the licensee's receipt of the NT EPA's approval of the environmental audit scope; and
 - 40.3 the written report is provided in full to the NT EPA within 5 business days of being signed by the qualified person.

MONITORING

- 41 The licensee must conduct surface water monitoring in accordance with Attachment A
- 42 The licensee must conduct ground water monitoring in accordance with Attachment B.
- 43 The licensee must conduct Stack Emission Monitoring in accordance with Attachment C.
- 44 The licensee must, prior to the initial wet season release of storm water from the storm water collection pit as identified in Attachment A, ensure that the quality of the water is within the trigger values specified in Attachment A.
- 45 The licensee must conduct surface water monitoring for parameters listed in Attachment A in any bunded area where rainfall has collected and the licensee is considering transfer to the stormwater system.
- 46 The licensee must ensure that all samples and field environmental data are representative of the conditions at the time of sampling.
- 47 The licensee must ensure that all samples and field environmental data are collected in accordance with recognised Australian Standards and guidelines (such as AS/NZS 5667, ANZECC/ARMCANZ).
- 48 The licensee must ensure that all monitoring samples are analysed at a laboratory with current NATA accreditation or equivalent, for the parameters to be measured.
- 49 The licensee must ensure any samples collected in accordance with the Attachment A, Attachment B and Attachment C or in connection with the activity or this licence, are obtained by, or under the supervision of a qualified sampler.
- 50 The licensee must ensure that, for each sample collected in accordance with Attachment A, Attachment B and Attachment C or the activity the following information must be recorded and retained:
- 50.1 the date on which the sample was collected;
 - 50.2 the time at which the sample was collected;
 - 50.3 the location at which the sample was collected;
 - 50.4 the name of the person who collected the sample;
 - 50.5 the chain of custody forms relating to the sample;
 - 50.6 the field measurements (if any) and analytical results (if any) relating to the sample; and

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50.7 laboratory quality assurance and quality control documentation.

RECORDING AND REPORTING

- 51 The licensee must keep records of all transfers of stormwater from bunded areas to the stormwater system including:
- 51.1 results of water quality analysis taken as required by condition 32.1 of this licence;
 - 51.2 the date and time when the transfer began and ceased; and
 - 51.3 the volume transferred to the stormwater system.
- 52 The licensee must keep and maintain records relating to the activity undertaken and the listed waste handled by the licensee in each successive 12 month period following the commencement of this licence, which include:
- 52.1 the date of collection;
 - 52.2 the source of the listed waste;
 - 52.3 the name of the transport company, if not the licensee;
 - 52.4 the vehicle registration;
 - 52.5 a description of the listed waste;
 - 52.6 the quantity of the listed waste;
 - 52.7 the final destination of the listed waste; and
 - 52.8 whether the listed waste was stored, recycled, treated or disposed of.
- 53 The licensee must retain records relating to waste, including listed waste, as required by the conditions of this licence, for a period of 2 years after the end of the 12 month period to which the record relates.
- 54 The licensee must keep records of all non-compliances with this licence. These records must be adequate to enable the licensee to comply with the non-compliance notification conditions of this licence.
- 55 The licensee must notify the NT EPA of any non-compliance with this licence by completing the Non-Compliance Notification via NT EPA Online (or by emailing waste@nt.gov.au), as soon as practicable after (and in any case within 24 hours after) first becoming aware of the non-compliance.
- 56 The licensee must include in the notification of non-compliance the following information:
- 56.1 when the non-compliance was detected and by whom;
 - 56.2 the date and time of the non-compliance;
 - 56.3 the actual and potential causes and contributing factors to the non-compliance;
 - 56.4 the risk of environmental harm arising from the non-compliance;
 - 56.5 the action(s) that have or will be undertaken to mitigate any environmental harm arising from the non-compliance;
 - 56.6 corrective actions that have or will be undertaken to ensure the non-compliance does not reoccur;
 - 56.7 if no action was taken, why no action was taken; and

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- 56.8 a date when an incident investigation report will be submitted to the NT EPA.
- 57 A non-compliance with this licence includes:
- 57.1 an exceedance of a trigger value specified in Attachment A, Attachment B and Attachment C on three consecutive sampling occasions;
 - 57.2 subsequent consecutive exceedances of trigger values as described in condition 58.1; and
 - 57.3 an exceedance of a trigger value specified in Attachment A, Attachment B and Attachment C on a single occasion where the parameter measures greater than or equal to three times the trigger value.
- 58 The licensee must notify the NT EPA of any exceedance of trigger value as specified in Attachment A, Attachment B and Attachment C as soon as practicable after (and in any case within 24 hours after) first becoming aware of the exceedance.
- 59 The licensee must keep records of all exceedances of trigger values specified in Attachment A, Attachment B and Attachment C. These records must be adequate to enable the licensee to comply with the exceedance notification conditions of this licence.
- 60 The licensee must ensure that the notification of the trigger value exceedance includes the following information:
- 60.1 when the exceedance was detected and by whom;
 - 60.2 the date and time of the exceedance;
 - 60.3 the actual and potential causes and contributing factors to the exceedance;
 - 60.4 the risk of environmental harm arising from the exceedance assessed in accordance with relevant trigger values as specified in Attachment A, Attachment B and Attachment C;
 - 60.5 the action(s) that have or will be undertaken to address the exceedance and any resulting environmental harm; and
 - 60.6 if no action was taken, why no action was taken.
- 61 The licensee must submit a completed Annual Return via NT EPA Online within 10 business days after each anniversary date of this licence, which report relates to the preceding 12 month period.
- 62 The licensee must complete and provide to the NT EPA a Monitoring Report, as prescribed by this licence, within 10 business days after each anniversary date of this licence.
- 63 The licensee must ensure that each Monitoring Report:
- 63.1 is prepared in accordance with the requirements of the NT EPA 'Guideline for Reporting on Environmental Monitoring';
 - 63.2 reports on surface water, groundwater, stormwater transferred from bunded areas and stack emission monitoring undertaken for this licence and as part of the environmental monitoring program for the site;
 - 63.3 includes a tabulation of all monitoring data required as a condition of this licence. Data must be provided electronically in Microsoft Excel format;
 - 63.4 includes long term trend analysis of monitoring data to demonstrate any environmental impact associated with the activity over a minimum period of three years (where the data is available). Data used in this analysis must be provided electronically in Microsoft Excel format;

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- 63.5 provides an assessment on groundwater levels, including groundwater contours and tidal influence;
 - 63.6 reports on all exceedances and investigations undertaken for this licence; and
 - 63.7 includes an assessment of environmental impact from the activity.
- 64 The NT EPA may require the licensee to revise or amend and resubmit any Monitoring Report. Where the NT EPA requires the Monitoring Report to be resubmitted, the licensee must submit it to the NT EPA by the date specified by the NT EPA.

END OF LICENCE CONDITIONS

This licence is not valid unless signed below:



Peter Vasel
Director Environmental Operations
Delegate of the Northern Territory
Environment Protection Authority
Dated: 05/07/2022

END NOTES

This licence is a renewal which supercedes EPL229-01 with an expiry date of 28 June 2027

EPL229-01 was a renewal on 29 June 2020 with an expiry date of 28 June 2020

EPL229 was issued on 21 December 2017 with an expiry date of 23 December 2019

The End Notes are to assist with historical records.

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DEFINITIONS

All terms in the Licence which are defined in the *Waste Management and Pollution Control Act* have the meaning given in that Act unless otherwise or further defined in this section.

DEFINITION	In this licence, unless a contrary intention appears:
24 hour emergency contact	the phone number of a person who can be contacted at any time and be capable of responding to and providing information about any incident associated with the activity.
Activity	the Scheduled activity as described on the covering page of this licence.
Air	includes any layer of the atmosphere.
Annual fee	yearly fee payable in respect of the activity as specified in the WMPC Act and the Regulations.
Annual Return	an NT EPA prescribed format for demonstrating and reporting compliance with the conditions of this licence and providing information on waste volumes for the preceding 12 month period.
ANZECC/ARMCANZ	Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, 2000: National Water Quality Management Strategy: Australian Guidelines for Water Quality Monitoring and Reporting.
Business days	a day not Saturday, Sunday or a public holiday, in the Northern Territory.
Community feedback number	a telephone number enabling members of the public to contact, at any time, a person or voice mail system that can accept, on behalf of the licensee, enquiries or complaints about the activity, and to which the licensee must respond.
Complaint Log	a register of complaints to be maintained by the Licensee that records the details of each complaint received in relation to the activity.
Consultation and Communication Plan	a written plan documenting proposed consultation and communications for the activity before, during and after the activity which includes a strategy for communicating with members of the public who are likely to have a real interest in, or be affected by, the activity.
Contact details	includes the 24 hour emergency contact, and name, position title and phone number of a representative of the licensee who can be contacted about the licence and activity.
Contaminant	a solid, liquid or gas or any combination of such substances and includes: (a) noise, odour, heat and electromagnetic radiation; (b) a prescribed substance or prescribed class of substances; and (c) a substance having a prescribed property or prescribed class of properties.
Discharges	allow a liquid, gas or other substance to flow out from where it has been confined.
Emergency Response Plan	a written plan documenting the licensee's procedures for responding to emergencies caused by, resulting from or associated with the activity and that may cause environmental harm.
Environmental audit	has the meaning given in section 47 of the WMPC Act.

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Environmental harm	(a) any harm to or adverse effect on the environment; or (b) any potential harm (including the risk of harm and future harm) to or potential adverse effect on the environment, of any degree or duration and includes environmental nuisance.
Environmental nuisance	means: (a) an adverse effect on the amenity of an area that: (i) is caused by noise, smoke, dust, fumes or odour; and (ii) unreasonably interferes with or is likely to unreasonably interfere with the enjoyment of the area by persons who occupy a place within the area or are otherwise lawfully in the area; or (b) an unsightly or offensive condition caused by contaminants or waste.
Incident	includes: (a) an accident, emergency or malfunction; and (b) a deliberate action, whether or not that action was taken by the person conducting the activity in the course of which the incident occurred.
Listed waste	a waste included under Schedule 2 of the Regulations.
Maintain	kept in a manner that it does not present or cause a risk of environmental harm or a hazard to persons or property or, for the purposes of documents including plans, a process of reviewing and amending documentation to ensure it is relevant.
Material environmental harm	environmental harm that: (a) is not trivial or negligible in nature; (b) consists of an environmental nuisance of a high impact or on a wide scale; (c) results, or is likely to result, in not more than \$50,000 or the prescribed amount (whichever is greater) being spent in taking appropriate action to prevent or minimise the environmental harm or rehabilitate the environment; or (d) results in actual or potential loss or damage to the value of not more than \$50,000 or the prescribed amount (whichever is greater).
NATA	National Association of Testing Authorities, Australia.
Non-compliance	failure or refusal to comply, whether by act or omission, with obligations or requirements and includes any exceedance of a licence limit.
Non-compliance notification	an NT EPA prescribed format for notifying the NT EPA of a non-compliance.
NT EPA Online	online system for Environment Protection Licence (EPL), Environment Protection Approval (EPA) and Waste Discharge Licence (WDL) lodgement and maintenance.
Plant and equipment	all material items used in association with the activity, including (but not limited to) storage vessels and containers, pipe work and hosing, vehicles (including vessels), tools, and measuring equipment.
Point source discharge	means any discernible, confined or discrete conveyance from which contaminants or waste are or may be discharged.
Pollute	(a) emit, discharge, deposit, or disturb, directly or indirectly, a contaminant or waste; or (b) cause, permit, or fail to prevent, directly or indirectly, the emission, discharge, deposition, disturbance or escape of a contaminant or waste.
Pollution	(a) a contaminant or waste that is emitted, discharged, deposited or disturbed or that escapes; or (b) a contaminant or waste, effect or phenomenon, that is present in the

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environment as a consequence of an emission, discharge, deposition, escape or disturbance or a contaminant or waste.

Premises	the premises identified in this licence which includes equipment, plant and structures, whether stationary or portable, and the land on which premises are situated.
Public entrance	access to the premises that is utilised by the public.
Qualified person	a person registered under Section 68 of the WMPC Act.
Qualified sampler	a person who has training and experience in obtaining samples from the relevant environmental medium.
Regulations	<i>Waste Management and Pollution Control (Administration) Regulations.</i>
Rehabilitation Plan	a written plan to ensure that the objectives of rehabilitation are achieved as set out in the NT EPA Guidelines for the Siting, Design and Management of Solid Waste Disposal Sites in the Northern Territory.
Serious environmental harm	environmental harm that is more serious than material environmental harm and includes environmental harm that: (a) is irreversible or otherwise of a high impact or on a wide scale; (b) damages an aspect of the environment that is of a high conservation value, high cultural value or high community value or is of special significance; (c) results or is likely to result in more than \$50,000 or the prescribed amount (whichever is greater) being spent in taking appropriate action to prevent or minimise the environmental harm or rehabilitate the environment; or (d) results in actual or potential loss or damage to the value of more than \$50,000 or the prescribed amount (whichever is greater).
Stormwater	water flowing over ground surfaces, in natural streams and drains as a direct result of rainfall over a catchment and consists primarily of rainfall runoff.
Trigger values	assigned value for each indicator used to assess the risk to an environmental value, a value that initiates some type of pre-defined management action.
Waste	(a) a solid, a liquid or a gas; or (b) a mixture of such substances, that is or are left over, surplus or an unwanted by-product from any activity (whether or not the substance is of value) and includes a prescribed substance or class of substances.
Wastewater	water that contains a contaminant or waste.
Water	includes: (a) surface water, ground water and tidal waters; (b) coastal waters of the Territory, within the meaning of the Coastal Waters (Northern Territory Powers) Act 1980 of the Commonwealth; and (c) water containing an impurity.
WMPC Act	the Northern Territory <i>Waste Management and Pollution Control Act</i> .

Attachment A – Surface Water Monitoring

		Site Code	SWMP1
		Latitude	-12.479694°
		Longitude	130.898194°
Parameter	Unit	Trigger Value	Frequency
Field Measurements			
Temperature	°C	-	D
pH	pH units	7.0 – 8.5 ¹	D
Electrical Conductivity	µS/cm	-	D
Dissolved Oxygen	% saturation	80 - 100 ¹	D
Major Ions			
Calcium	mg/L	-	M
Magnesium	mg/L	-	M
Sodium	mg/L	-	M
Potassium	mg/L	-	M
Carbonate	mg/L	-	M
Bicarbonate	mg/L	-	M
Chloride	mg/L	-	M
Sulphate	mg/L	-	M
Nutrients			
Total Phosphorous	µg/L	20 ¹	M
Total Nitrogen	µg/L	270 ¹	M
Oxides of Nitrogen	µg/L	20 ¹	M
Ammonium	µg/L	20 ¹	M
Metals and Metalloids (total and filtered)			
Antimony	µg/L	270 ²	M
Arsenic	µg/L	4.5 ²	M
Barium	µg/L	-	M
Beryllium	µg/L	-	M
Boron	µg/L	5100 ²	M
Cadmium	µg/L	5.5 ³	M
Chromium	µg/L	4.4 ^{3#}	M
Cobalt	µg/L	1 ³	M
Copper	µg/L	1.3 ³	M
Lead	µg/L	4.4 ³	M
Manganese	µg/L	80 ²	M
Mercury (inorganic)	µg/L	0.4 ³	M
Nickel	µg/L	70 ³	M
Selenium	µg/L	3 ²	M
Vanadium	µg/L	100 ³	M
Zinc	µg/L	15 ³	M
Hydrocarbons			
BTEXN (benzene, toluene, ethylbenzene, xylene and naphthalene)	µg/L	700 (benzene) ³ 180 (toluene) ² 70 (naphthalene) ³	M
Polycyclic aromatic hydrocarbons (PAHs)	µg/L	-	M
Total Recoverable Hydrocarbons (TRH)	µg/L	-	M
Organic Alcohols			
Monoethylene Glycol	µg/L	-	M

Triethylene Glycol	µg/L	-	M
Other			
PFAS (per and poly-fluoroalkyl substances)	µg/L	0.13 (PFOS) ⁴ 220 (PFAS) ⁴	M
Polychlorinated Biphenyls (PCBs)	µg/L	-	M
Total Cyanide	µg/L	4 ³	M
Phenols	µg/L	400 (Phenol) ³	M
Total Suspended Solids (TSS)	mg/L	10 ¹	M
Total Dissolved Solids (TDS)	mg/L	-	M
Key: D – Daily during months of release of storm water M – Monthly during months of release of storm water ¹ Value taken from Water Quality Objectives for the Darwin Harbour Region – mid-estuary ² Value is low reliability trigger value for marine waters from Value taken from ANZG 2018; ³ Value taken from ANZG 2018; trigger values for toxicants at 95% species protection for marine water ⁴ Value taken from the PFAS National Environment Management Plan Version 2.0 for 95% species protection in marine waters (note they are interim values) # Chromium VI (CrIV) was used instead of Chromium III (CrIII). Naturally occurring chromium is present as trivalent (CrIII) while hexavalent Chromium (CRVI) in the environment is almost totally derived from human activities [WHO 1990].			

Attachment B – Groundwater Monitoring

Site Code Latitude Longitude		Authorised Monitoring Bores				
		EMB7	EMB12	EMB13	EMB14	EMB15
		-12.479693°	-12.479644°	-12.480093°	-12.480813°	-12.480607°
		130.899048°	130.898153°	130.899119°	130.898873°	130.897854°
Parameter	Unit					
Field Measurements						
Standing Water Level	mAHD	M	M	M	M	M
Temperature	°C	A	A	M	M	A
pH	pH units	A	A	M	M	A
Electrical Conductivity	µS/cm	A	A	M	M	A
Dissolved Oxygen	mg/L	A	A	M	M	A
REDOX	mV	A	A	M	M	A
Major Ions						
Calcium	mg/L	A	A	Q	Q	A
Magnesium	mg/L	A	A	Q	Q	A
Sodium	mg/L	A	A	Q	Q	A
Potassium	mg/L	A	A	Q	Q	A
Carbonate	mg/L	A	A	Q	Q	A
Bicarbonate	mg/L	A	A	Q	Q	A
Chloride	mg/L	A	A	Q	Q	A
Sulphate	mg/L	A	A	Q	Q	A
Nutrients						
Total Phosphorous	mg/L	A	A	Q	Q	A
Total Nitrogen	mg/L	A	A	Q	Q	A
Oxides of Nitrogen	mg/L	A	A	Q	Q	A
Ammonium	mg/L	A	A	Q	Q	A
Metals and Metalloids (filtered)						
Antimony	µg/L	A	A	Q	Q	A
Arsenic	µg/L	A	A	Q	Q	A
Barium	µg/L	A	A	Q	Q	A
Beryllium	µg/L	A	A	Q	Q	A
Boron	µg/L	A	A	Q	Q	A
Cadmium	µg/L	A	A	Q	Q	A
Chromium	µg/L	A	A	Q	Q	A
Cobalt	µg/L	A	A	Q	Q	A
Copper	µg/L	A	A	Q	Q	A
Lead	µg/L	A	A	Q	Q	A
Manganese	µg/L	A	A	Q	Q	A
Mercury (Inorganic)	µg/L	A	A	Q	Q	A
Nickel	µg/L	A	A	Q	Q	A
Selenium	µg/L	A	A	Q	Q	A
Vanadium	µg/L	A	A	Q	Q	A
Zinc	µg/L	A	A	Q	Q	A
Hydrocarbons						
BTEXN (benzene, toluene, ethylbenzene, xylene and naphthalene)	µg/L	A	A	Q	Q	A

Polycyclic aromatic hydrocarbons (PAHs)	µg/L	A	A	Q	Q	A
Total recoverable Hydrocarbons (TRH)	µg/L	A	A	Q	Q	A
Organic Alcohols						
Monoethylene Glycol	µg/L	A	A	Q	Q	A
Triethylene Glycol	µg/L	A	A	Q	Q	A
Other						
PFAS (per and poly-fluoroalkyl substances)	µg/L	A	A	Q	Q	A
Polychlorinated Biphenyls (PCBs)	µg/L	A	A	Q	Q	A
Total Cyanide	µg/L	A	A	Q	Q	A
Phenols	µg/L	A	A	Q	Q	A
mAHD – Australian Height Datum						

Attachment C – Stack Emission Monitoring

			Air Emission Monitoring			
			Location			
			AEP1	AEP2		
			Latitude	-12.480152°		
Longitude	130.898891°	130.898635°				
Parameter	Units	Emission Limit ²	Frequency		Test Method ²	Monitoring Method ²
Solid Particles (total)	mg/m³	50	Annually	Annually	TM-15	-
Oxides of Nitrogen (as NO ₂)	mg/m³	350	Annually	-	TM-11	CEM-2
Hydrogen Chloride	mg/m³	100	Annually	-	TM-8	-
Cadmium ³	mg/m³	0.2	Annually	-	TM-12 TM-13 TM-14	-
Carbon Monoxide ¹	mg/m³	-	Annually	-	TN-23	CEM-4
Mercury ³	mg/m³	0.2	Annually	-	TM-12 TM-13 TM-14	-
Type 1 and Type 2 substances in aggregate. Antimony, arsenic, beryllium, chromium, cobalt, lead manganese, nickel, selenium and vanadium.	mg/m³	1	Annually	-	TM-12 TM-13 TM-14	-
Sulphur Dioxide	mg/m³	150	Annually	-	TM-4	CEM-2
Volatile Organic Compounds (VOCs)	mg/m³	40	Annually	Annually	TM-34	CEM-8 CEM-9 CEM-10
Key AEP1 – Boiler stack release point. AEP2 – Cold stack release point. Receives inflow from storage tanks carbon filter, oil production carbon filter and glycol production carbon filter. ¹ No emission limit imposed. Required to inform future air emission monitoring plans. ² Source: NSW Protection of the Environment Operations (Clean Air) Regulation 2010. ³ And their compounds.						

Appendix B Site Weather Data

Monthly Rainfall (millimetres)

EAST ARM

Station Number: 014260 · State: NT · Opened: 1991 · Status: Open · Latitude: 12.48°S · Longitude: 130.90°E · Elevation: 10 m

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1992	300.3	119.8	193.7	162.3	6.0			2.0	9.0	210.4	165.8		
1995			694.8										
2000		707.8	427.1	334.8		0.0	0.0	0.0	3.0	75.1	32.7	286.2	
2001	261.8	509.4	340.0	76.3	3.0	0.0	15.0	0.0	0.0	85.3			
2002	123.0	378.0	246.5	51.5	8.5	0.0	0.0	0.0	51.0		203.5		
2003	513.0			0.0	0.0	0.0	0.0	3.0	2.0		273.0	391.0	
2004	412.5	393.0	408.0	6.0	53.5	26.0	0.0	0.0	0.0	31.0		256.5	
2005	424.0	208.0	155.4	33.5	0.0	0.0	0.0	0.0	6.3	49.4	158.1		
2006	437.9		492.8		16.0	0.0	0.0	0.0	0.5	39.6	47.4		
2007	259.3	380.3		16.2	53.0	1.0	0.0	0.0	31.0	17.4		335.0	
2008	447.5	555.2		0.0	0.0	0.0	0.0	0.0	3.0		107.1	303.6	
2009	355.7	473.1	127.5		11.0	1.9	0.0	0.0	11.0	37.5	63.7	494.2	
2010	789.2	429.8	214.4		6.0	0.0	2.0	0.0			197.7	407.4	
2011	673.7	991.8								102.0	130.0	290.7	
2019		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
2020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	4.0
2021	502.0	346.0	209.5	68.5	0.0	6.0	0.0	55.0	1.5	62.0	100.0	407.0	1757.5
2022	514.5	189.2	158.1	89.8	10.0	9.0							

Quality control: 12.3 Done & acceptable, 12.3 Not completed or unknown

Monthly Rainfall (millimetres)

EAST ARM

Station Number: 014260 · State: NT · Opened: 1991 · Status: Open · Latitude: 12.48°S · Longitude: 130.90°E · Elevation: 10 m

Statistics for this station calculated over all years of data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Lowest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0
Highest	789.2	991.8	694.8	334.8	53.5	26.0	15.0	55.0	51.0	210.4	273.0	494.2	1757.5

1) Calculation of statistics

Summary statistics, other than the Highest and Lowest values, are only calculated if there are at least 20 years of data available.

2) Gaps and missing data

Gaps may be caused by a damaged instrument, a temporary change to the site operation, or due to the absence or illness of an observer.

3) Further information

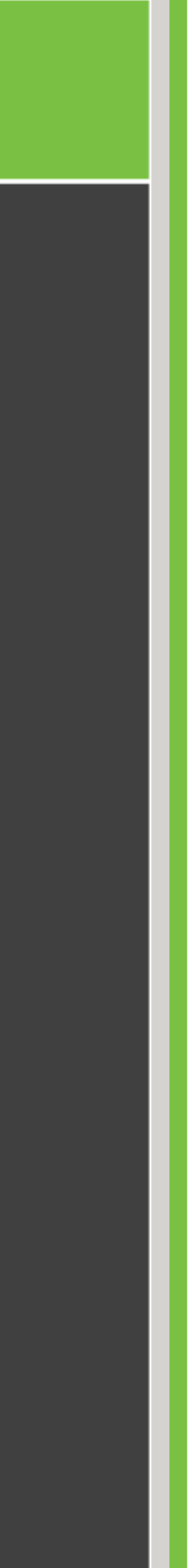
<http://www.bom.gov.au/climate/cdo/about/about-rain-data.shtml>.

Product code: IDCJAC0001 reference: 88855620 Created on Tue 23 Aug 2022 20:58:56 PM AEST



Australian Government
Bureau of Meteorology

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Appendix C Groundwater Monitoring Monthly Reports



20 October 2021

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George Hatzimihalis
Technical Director
Global Resource Recovery
Vopak Terminal, East Arm
Northern Territory 0822

RE: GLOBAL RESOURCE RECOVERY – QUARTERLY GROUNDWATER MONITORING EVENT (SEPTEMBER 2021)

1.0 Introduction

1.1 Background

Greencap Pty Ltd (Greencap) was commissioned by Global Resource Recovery (GRR) to implement a groundwater monitoring program, inclusive of monthly, quarterly and annual monitoring events at the Vopak Terminal located at East Arm, Northern Territory (the Site).

Greencap has undertaken a quarterly groundwater monitoring at the Site in accordance with the Northern Territory (NT) Environment Protection Authority (EPA) Environmental Protection Licence (EPL) 229-01 (the Licence) – attached in Appendix A.

This report details the results of the September quarterly monitoring event.

This document has been prepared with the reference to the (NT EPA): *Guideline for Reporting on Environmental Monitoring, 2016*.

1.2 Monitoring Scope

The groundwater monitoring scope and analytical program are outlined in the Licence (Appendix A), inclusive of quarterly groundwater sampling from EMB13 and EMB14.

The results of groundwater sampling were not compared to any criteria as there are no specific trigger values listed in the Licence. Results summary tables are included in Attachment 3.

2.0 Groundwater Quarterly Monitoring Event – September 2021

The quarterly monitoring event included:

- gauging of water levels in five monitoring bores (EMB7, EMB12, EMB13, EMB14 and EMB15).
- measurement of field parameters in two monitoring bores (EMB13 and EMB14).
- laboratory analytical testing of sample collected from EMB13 and EMB14, including:
 - Ø Major cations and anions
 - Ø Nutrients
 - Ø Heavy metals
 - Ø Hydrocarbon compounds
 - Ø Cyanide
 - Ø Glycols
 - Ø Polychlorinated Biphenyls (PCBs)
 - Ø Per- and polyfluoroalkyl substances (PFAS)

2.1 Sampling Methodology

Greencap conducted the monitoring event on 23 September 2021 which involved the gauging of five monitoring bores; and the measurement of field parameters, collection of samples and testing of laboratory analytes in two monitoring bores.

All groundwater wells were sampled using an industry standard low flow groundwater sampling techniques with dedicated tubing and in accordance with AS/NZS 5667.1:1998, AS/NZS 5667.11:1998 and <https://www.waterquality.gov.au/anz-guidelines>. The flow rate was monitored and regulated using an interface probe to maintain a stable water level during purging and sampling of groundwater.

The following methodology was applied:

- Measuring standing water levels (SWL) from the surveyed point at the top of the casings using water/product interface water level meter prior to sampling.
- Monitoring physio-chemical parameters (pH, temperature, dissolved oxygen, electrical conductivity, salinity, total dissolved solids, turbidity and oxidation-reduction potential) during purging using a calibrated water quality meter. Sampling occurred when the drawdown and these parameters had stabilised within the ranges presented in *NT Department of Mines and Energy Methodology for the Sampling of Ground Waters (2009)*.
- The sampler wore a clean pair of disposable nitrile gloves when collecting each sample.
- All groundwater samples collected in appropriate bottles/containers provided by analytical laboratories and placed in a chilled esky for transportation immediately after collection.
- Field observations were recorded during sampling including aesthetic evidence of contamination such as sheen, colour and odour.
- Collection of appropriate quality assurance/quality control (QA/QC) samples including intra- and inter-laboratory duplicates and rinsate and trip blanks.

2.2 Field Observations

Observations noted during the monitoring event were recorded on field record sheets and included groundwater colour, odours, sheens and any other anomalies. The groundwater was generally clear and no odours or sheens were noted from either bore during the monitoring.

The recorded SWLs and measured field parameters are presented in Table 1 and Table 2 respectively.

Table 1 – September 2021 Groundwater Levels

Well ID	Date	SWL			Depth of Bore (m)
		mBTOC	mBGL	mAHD	
EMB7	23/9/21	2.569	2.569	3.856	9.237
EMB12	23/9/21	3.100	3.100	3.400	9.325
EMB13	23/9/21	5.246	4.446	3.590	10.245
EMB14	23/9/21	5.518	4.818	3.737	9.803
EMB15	23/9/21	2.557	2.557	4.097	9.314

mBTOC – metres below top of casing
 mBGL – metres below ground level
 mAHD – metres Australian Height Datum

Table 2 – September 2021 Field Parameters

Well ID	pH	Temperature (°C)	Dissolved Oxygen (% saturation)	Electrical Conductivity (µS/cm)	Salinity (PSU)	Total Dissolved Solids (mg/L)	Turbidity (NTU)	ORP (mV)
EMB13	7.24	31.8	32.7	281.3	0.13	183.1	3.91	-35.2
EMB14	5.41	33.3	18.4	377.6	0.18	250.3	6.09	93.2

Field records are presented in Attachment 2.

2.3 Analytical Results

Groundwater samples were analysed at National Association of Testing Authorities (NATA) - accredited laboratories (Eurofins – primary, ALS – secondary). The results are included in Attachment 3 and are summarised below in Table 3. Laboratory certificates of analysis are included in Appendix B.

Table 3 – Analytical Results Summary Above Laboratory Limits of Reporting (LOR)

Parameter	Unit of Measurement	LOR	Range of Analytical Results	
			EMB13	EMB14
Nutrients & Inorganics				
Total Phosphate (as P)	µg/L	10	<10	20
Total Nitrogen	µg/L	200	6,300	11,200
Kjeldahl Nitrogen Total	µg/L	200	500	1500
Oxides of Nitrogen	µg/L	50	5,800	9,700
Ammonia (as N)	µg/L	10	90	90
Cyanide (total)	µg/L	5	6	<5
Anions				
Chloride	µg/L	1,000	77,000	67,000
Cations				
Calcium	µg/L	500	1000	12,000
Magnesium	µg/L	500	800	2,300
Potassium	µg/L	500	1000	3600
Sodium	µg/L	500	18,000	18,000
Heavy Metals (filtered)				
Barium	µg/L	1	51	213
Copper	µg/L	1	3	<1
Lead	µg/L	1	2	<1
Manganese	µg/L	1	35	12
Zinc	µg/L	5	30	109
PFAS				
Sum of PFAS (n=30)	µg/L	0.1	55.49	4.45

The results are summarised as follows:

- Antimony, arsenic, beryllium, cadmium, chromium, cobalt, mercury, nickel and selenium (all filtered), total recoverable hydrocarbons (TRH), polycyclic aromatic hydrocarbons (PAH) and organochlorine pesticides (OCP) were all reported to be below the laboratory limits of reporting (LORs) for both monitoring bores.
- Several nutrients and organics, chloride, calcium, magnesium, potassium, sodium and filtered heavy metals – barium, copper, lead, manganese and zinc were reported above the LORs in both monitoring bores, with the exception of total phosphate in EMB13 and cyanide, copper and lead in EMB14.
- A range of Per- and Polyfluoroalkyl Substances (PFAS) were detected in both monitoring bores.

2.4 QA/QC Results

Groundwater Duplicate Analysis

Field duplicates (QC01 and QC01A, duplicates of EMB13) were collected during the monitoring event and analysed at the intra (Eurofins) and inter (ALS) laboratories for benzene, toluene, ethylbenzene, xylene, naphthalene, TRH, PAH and phenols.

Duplicate analytical results were assessed by calculating relative percent differences between primary sample results and duplicate sample results. All of the inter and intra laboratory duplicate groundwater analyses had RPD values below the recommended comparison criteria of 50%.

A table summarising the duplicate sample results is presented at the end of this report (refer to Attachment 3).

Blank Analyses

Rinsate blank samples (RB01) was collected on 23 September and analysed at the primary laboratory for TRH and BTEXN. The rinsate blank samples were collected from decontaminated sampling equipment to ensure adequate cleaning has occurred.

A trip blank sample (TB01) was prepared and kept with the portable sample cooler for the duration of the and delivered to the primary laboratory for TRH and BTEXN analysis. The trip blanks were prepared using de-ionised water to detect potential cross-contamination throughout the sampling and sample delivery stages of the GME.

A table summarising the rinsate and trip blanks sample results is presented at the end of this report (refer to Attachment 3).

3.0 Conclusions

Greencap conducted a quarterly groundwater monitoring event at the Vopak Terminal at East Arm, in accordance with EPL229-01 in September 2021. Physico-chemical groundwater parameters were measured in the field and samples were collected from the two monitoring bores (EM13 and EMB14) and submitted to NATA-accredited laboratories for analytical testing.

Many analytes including filtered metals (antimony, arsenic, beryllium, cadmium, chromium, cobalt, mercury, nickel and selenium), total recoverable hydrocarbons, polycyclic aromatic hydrocarbons and organochlorine pesticides were reported to be below the laboratory limits of reporting in both monitoring bores.

Several nutrients and organics, chloride, calcium, magnesium, potassium, sodium and filtered heavy metals – barium, copper, lead, manganese and zinc were reported above the LORs in both monitoring bores, with the exception of total phosphate in EMB13 and cyanide, copper and lead in EMB14.

A range of Per- and Polyfluoroalkyl Substances (PFAS) compounds were detected in both monitoring bores.

The next groundwater quarterly event is scheduled to occur in December 2021.

Attachments

- 1 Statements of Limitation
- 2 Field Record Sheets
- 3 Results Summary Tables (including QA/QC)

Appendices

- A Environmental Protection Licence 229-01
- B Laboratory Certificates of Analysis

Yours Sincerely,



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Groundwater Monitoring Event – September 2021

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 1: Statements of Limitation

Statements of Limitation

All and any Services proposed by Greencap to the Client were subject to the Terms and Conditions listed on the Greencap website at: <https://www.greencap.com.au/terms-conditions> Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap does not agree to any alternative terms or variation of these terms if subsequently proposed by the Client. The Services were carried out in accordance with the current and relevant industry standards of testing, interpretation and analysis. The Services were carried out in accordance with Commonwealth, State, Territory or Government legislation, regulations and/or guidelines. The Client was deemed to have accepted these Terms when the Client signed the Proposal (where indicated) or when the Company commenced the Services at the request (written or otherwise) of the Client.

The services were carried out for the Specific Purpose, outlined in the body of the Proposal. To the fullest extent permitted by law, Greencap, its related bodies corporate, its officers, consultants, employees and agents assume no liability, and will not be liable to any person, or in relation to, any losses, damages, costs or expenses, and whether arising in contract, tort including negligence, under statute, in equity or otherwise, arising out of, or in connection with, any matter outside the Specific Purpose.

The Client acknowledged and agreed that proposed investigations were to rely on information provided to Greencap by the Client or other third parties. Greencap made no representation or warranty regarding the completeness or accuracy of any descriptions or conclusions based on information supplied to it by the Client, its employees or other third parties during provision of the Services. Under no circumstances shall Greencap have any liability for, or in relation to, any work, reports, information, plans, designs, or specifications supplied or prepared by any third party, including any third party recommended by Greencap. The Client releases and indemnifies Greencap from and against all Claims arising from errors, omissions or inaccuracies in documents or other information provided to Greencap by the Client, its employees or other third parties.

The Client was to ensure that Greencap had access to all information, sites and buildings as required by or necessary for Greencap to undertake the Services. Notwithstanding any other provision in these Terms, Greencap will have no liability to the Client or any third party to the extent that the performance of the Services was not able to be undertaken (in whole or in part) due to access to any relevant sites or buildings being prevented or delayed due to the Client or their respective employees or contractors expressing safety or health concerns associated with such access.

Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap, its related bodies corporate, its officers, employees and agents assume no liability and will not be liable for lost profit, revenue, production, contract, opportunity, loss arising from business interruption or delay, indirect or consequential loss or loss to the extent caused or contributed to by the Client or third parties, suffered or incurred arising out of or in connection with our Proposals, Reports, the Project or the Agreement. In the event Greencap is found by a Court or Tribunal to be liable to the Client for any loss or damage arising in connection with the Services, the Client's entitlement to recover damages from Greencap shall be reduced by such amount as reflects the extent to which any act, default, omission or negligence of the Client, or any third party, caused or contributed to such loss or damage. Unless otherwise agreed in writing and signed by both parties, Greencap's total aggregate liability will not exceed the total consulting fees paid by the client in relation to this Proposal. For further detail, see Greencap's Terms and Conditions available at <https://www.greencap.com.au/terms-conditions>

The Report is provided for the exclusive use of the Client and for this Project only, in accordance with the Scope and Specific Purpose as outlined in the Agreement, and only those third parties who have been authorized in writing by Greencap. It should not be used for other purposes, other projects or by a third party unless otherwise agreed and authorized in writing by Greencap. Any person relying upon this Report beyond its exclusive use and Specific Purpose, and without the express written consent of Greencap, does so entirely at their own risk and without recourse to Greencap for any loss, liability or damage. To the extent permitted by law, Greencap assumes no responsibility for any loss, liability, damage, costs or expenses arising from interpretations or conclusions made by others, or use of the Report by a third party. Except as specifically agreed by Greencap in writing, it does not authorize the use of this Report by any third party. It is the responsibility of third parties to independently make inquiries or seek advice in relation to their particular requirements and proposed use of the site.

The conclusions, or data referred to in this Report, should not be used as part of a specification for a project without review and written agreement by Greencap. This Report has been written as advice and opinion, rather than with the purpose of specifying instructions for design or redevelopment. Greencap does not purport to recommend or induce a decision to make (or not make) any purchase, disposal, investment, divestment, financial commitment or otherwise in relation to the site it investigated.

This Report should be read in whole and should not be copied in part or altered. The Report as a whole set outs the findings of the investigations. No responsibility is accepted by Greencap for use of parts of the Report in the absence (or out of context) of the balance of the Report.



Groundwater Monitoring Event – September 2021

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 2: Field Record Sheets

Client: GRR		Job No: J174436
Project: Groundwater Monitoring		Gauged by: VB
Location: 800 Berrimah Rd, East Arm		Date: 23/9/21

Water Level Dipper Type (interphase, length etc):

1P

Time	Well Name	Depth to Product (m)	Depth to water (m)	Product Thickness (mm)	Depth of Well (m)	Comments
0910	EMB13	—	5.246	—	10.245	
1025	EMB14	—	5.518	—	9.803	
1146	EMB7	—	2.569	—	9.237	
1156	EMB12	—	3.100	—	9.325	
1201	EMB15	—	2.557	—	9.314	

Observations / Comments:

Weather Conditions (e.g. cloudy, sunny, windy etc), Pumping, etc

SUNNY & SLIGHT WIND

Groundwater Sampling Record

Client: <u>GRR</u>	Job No: <u>J174436</u>	Well ID EMB13
Project: <u>Groundwater Monitoring</u>	Sampled by: <u>VB</u>	
Location: <u>800 Berrimah Rd, East Arm</u>	Date: <u>23/9/21</u>	

WELL DETAILS		SAMPLING EQUIPMENT		*Other Sampling Equipment / Method
Well depth: <u>10.245</u> (m)	Device: <u>micropurge</u> <u>peristaltic</u> footvalve bailer			
Casing diameter: <u>50</u> (mm)	Method: <u>low-flow</u> 4-well-volume purged dry			
Casing type: <u>PVC</u> / steel / other	WQM Make: <u>YSI</u>			
Depth to product (m bTOC)	WL Meter: <u>interface</u> non-interface			
Depth to water: <u>5.246</u> (m bTOC)	Screen (from - to), m			
Product thickness (m)	Pump Depth (m bTOC)			

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
SUNNY & SLIGHT WIND

Purging instructions:

Low Flow: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume: The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre, 100mm (4") diameter - 8 L/metre, 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment Turbidity, Colour, Odour, Sheen, etc
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond $\mu\text{S/cm}$ mS/cm	ORP mV	DO mg/L / ppm / %	
0921	INT	5.394	31.6	9.48	370.4	66.9	48.5	SAL TDS PSO mg/L
0924	1.5	5.871	31.9	6.38	275.3	50.6	25.5	L-m turbidity, no sheen/odour, clear
0927	3.0	6.053	31.7	6.54	276.3	30.8	24.3	0.13 177.4
0931	4.5	6.303	31.8	7.27	278.6	-20.5	27.3	0.13 178.1
0935	6.0	6.530	31.7	7.41	281.8	-35.0	30.8	0.13 175.4
0940	7.5	6.575	31.8	7.01	279.4	-15.0	28.3	0.13 181.35
0945	9.0	6.596	31.9	7.22	282.7	-31.5	30.1	0.13 183.30
0948	10.5	6.601	31.9	7.27	281.0	-36.5	32.9	0.13 182.00
0951	12	6.603	31.8	7.24	281.3	-35.2	32.7	0.13 183.95

TURB NTU

3.91

Observations during Sampling: eg. odours, sheens, turbidity, water colour, etc

L-M TURB, CLEAR, NO SHEEN/ODOUR
SLOW RECHARGE, SAMPLED AFTER 12L PURGES

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments
Glass amber (100-250ml)	2	none	Duplicate ID <u>Q001 - 1 x Amber</u> <u>2 x VIAL</u>	
Glass vial (40mL)	2	HCl	Triplicate ID <u>Q001A - 1 x Amber</u> <u>2 x VIAL</u>	
Plastic (60mL) - metals* (AUS)	1	HNO3	Blanks	
Plastic (60mL) - cyanide, CrVI*	1	NaOH	Rinsate ID	
Plastic (60mL) - nutrients	1	H2SO4	<u>NU301</u>	
Plastic (500mL) - inorganics	1	none	<u>TB01</u>	
Plastic () PFA	1			
Plastic ()				
<u>anycol</u>	2			

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

Client: <u>GRR</u>		Job No: <u>J174436</u>		Well ID	
Project: <u>Groundwater Monitoring</u>		Sampled by: <u>VB</u>		EMB14	
Location: <u>800 Berrimah Rd, East Arm</u>		Date:			

WELL DETAILS			SAMPLING EQUIPMENT				*Other Sampling Equipment / Method	
Well depth:	<u>9.314</u>	(m)	Device:	<u>non-purge</u>	<u>peristaltic</u>	footvalve		bailer
Casing diameter:	<u>50</u>	(mm)	Method:	<u>low-flow</u>	4-well-volume	purged dry		
Casing type:	<u>EVO</u>	steel / other	WQM Make:	<u>481</u>				
Depth to product	<u>—</u>	(m bTOC)	WL Meter:	<u>interface</u>	non-interface			
Depth to water:	<u>5.518</u>	(m bTOC)	Screen (from - to), m					
Product thickness	<u>—</u>	(m)	Pump Depth (m bTOC)					

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
SUNNY & SLIGHT WIND

Purging instructions:
Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

Low Flow: The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.

4-well volume: Well volume: 50mm (2") diameter - 2 L/metre; 100mm (4") diameter - 8 L/metre; 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment	
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond <u>µS/cm</u> / mS/cm	ORP mV	DO mg/L / ppm / %	Turbidity, Colour, Odour, Sheen, etc	
1035	1NT	5.666	32.9	4.67	377.1	163.2	51.5	0.18	244.4
1038	1.5	6.094	32.9	5.24	375.5	125.9	23.2	0.18	244.4
1042	3.0	6.499	32.9	5.55	376.9	99.9	20.8	0.18	244.4
1046	4.5	6.866	33.0	5.37	376.7	108.5	19.8	0.18	245.07
1050	6.0	7.166	33.0	5.13	385.2	116.2	18.3	0.18	250.90
1055	7.5	7.165	32.9	5.19	385.5	105.9	18.4	0.18	250.90
1058	9.0	7.165	32.9	5.38	385.1	97.7	18.7	0.18	250.25
1101	10.5	7.165	33.0	5.40	371.9	91.5	18.0	0.18	250.28
1104	12.0	7.165	33.3	5.41	377.6	93.2	18.4	0.18	250.26

Observations during Sampling: eg. odours, sheens, turbidity, water colour, etc
L-M TURBIDITY, CLEAR, NO SHEEN / ODOUR
DROPPED HEAD BY ~ 1.5m & QUICK RECHARGE, SAMPLED AFTER 12L PURGED

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments
Glass amber (100-250ml)	2	none	Duplicate ID	
Glass vial (40mL)	2	HCl		
Plastic (60mL) - metals* (AMS)	1	HNO3	Triplicate ID	
Plastic (60mL) - cyanide, CrVI*	1	NaOH		
Plastic (60mL) - nutrients	1	H2SO4	Blanks	
Plastic (500mL) - inorganics	1	none		
Plastic () <u>400025</u>	2		Rinsate ID	
Plastic () <u>PFAS</u>	1			

*samples for dissolved metals to be filtered in the field prior to filling sampling container



Groundwater Monitoring Event – September 2021

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 3: Results Summary Tables (including QA/QC)

Groundwater Monitoring Results Table
September 2021

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				SWL	Field Parameters									Metals														
				Standing Water Level	Temperature	pH	Electrical Conductivity	Salinity	ORP	Dissolved Oxygen	Total Dissolved Solids	Turbidity	Antimony (Filtered)	Arsenic (Filtered)	Barium (filtered)	Beryllium (Filtered)	Boron (filtered)	Cadmium (Filtered)	Chromium (total) (Filtered)	Cobalt (Filtered)	Copper (Filtered)	Lead (Filtered)	Manganese (Filtered)	Mercury (Filtered)	Nickel (Filtered)	Selenium (Filtered)	Vanadium (Filtered)	Zinc (Filtered)
EQL				mbgl	°C	pH unit	(µS/cm)	PSU	mV	% Sat.	mg/L	NTU	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L		
Monitoring Round	Field ID	Sampled Date	Lab Reports																									
Sep-21	EMB13	23/09/2021	827604 & ES2134300	5.803	36.8	7.24	281.3	0.13	-35.2	32.7	183.09	3.91	<1	<1	51	<1	<50	<0.2	<1	<1	3	2	35	<0.1	<1	1	<10	30
	EMB14			6.465	33.3	5.41	377.6	0.18	93.2	18.4	250.26	6.09	<1	<1	213	<1	<50	<0.2	<1	<1	<1	<1	12	<0.1	<1	<1	<10	109

Groundwater Monitoring Results Table
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				Inorganics						Anions						Cations				TRH - NEPM 1999 Fractions						TRH - NEPM 2013 Fractions							
				Ammonium Ion (as NH4)	Nitrate + Nitrite (oxides of nitrogen) (as N)	Nitrogen (Total)	Kjeldahl Nitrogen Total	Phosphate total (P)	Cyanide (total)	Chloride	Sulphate (as SO4)	Carbonate Alkalinity (as CaCO3)	Bicarbonate Alkalinity (as CaCO3)	Hydroxide Alkalinity (as CaCO3)	Total Alkalinity (as CaCO3)	Calcium	Magnesium	Potassium	Sodium	C6 - C9	C10 - C14	C15 - C28	C29-C36	+C10 - C36 (Sum of total)	Naphthalene	C6-C10	C6-C10 less BTEX (F1)	C10-C16	C10-C16 less NAPHTHALENE	C16-C34	C34-C40	C10 - C40 (Sum of total)	
EQL				10	50	200	200	10	5	1000	5000	10000	2000	20000	20000	500	500	500	500	20	50	100	100	100	1	20	20	50	50	100	100	100	
Monitoring Round		Field ID	Sampled Date	Lab Reports																													
Sep-21		EMB13	23/09/2021	827604 & ES2134300	90	5800	6300	500	<10	6	77000	<5000	<10000	<20000	<20000	1000	800	1000	18000	<20	<50	<100	<100	<100	<10	<20	<20	<50	<50	<100	<100	<100	
		EMB14		90.0	9700	11200	1500	20	<5	67000	<5000	<10000	<20000	<20000	<35000	12000	2300	3600	18000	<20	<50	<100	<100	<100	<10	<20	<20	<50	<50	<100	<100	<100	

Groundwater Monitoring Results Table
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				MAH								PAH																
				Benzene	Ethylbenzene	Isopropyl benzene (cumene)	Styrene	Toluene	Xylene (m & p)	Xylene (o)	Xylene Total	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo[b+g]fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Sum of total)
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL				1	1	1	1	1	2	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Monitoring Round	Field ID	Sampled Date	Lab Reports																									
Sep-21	EMB13	23/09/2021	827604 & ES2134300	<1	<1	<1	<1	<1	<2	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
	EMB14			<1	<1	<1	<1	<1	<2	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		

Groundwater Monitoring Results Table
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				PCBs								Phenols (Halogenated)								Phenols (non-Halogenated)								Glycols								
				Aroclor-1016	Aroclor-1221	Aroclor-1232	Aroclor-1242	Aroclor-1248	Aroclor-1254	Aroclor-1260	Total PCB*	2-Chlorophenol	2,4-Dichlorophenol	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,6-Dichlorophenol	4-Chloro-3-methylphenol	Pentachlorophenol	Tetrachlorophenols - Total	Total Halogenated Phenol*	2-Cyclohexyl-4,6-dinitrophenol	2-Methyl-4,6-dinitrophenol	2-Methylphenol (o-Cresol)	2-Nitrophenol	2,4-Dimethylphenol	2,4-Dinitrophenol	3&4-Methylphenol (m&p-Cresol)	4-Nitrophenol	Dinoseb	Phenol	Total Non-Halogenated Phenol*	Di-Ethylene Glycol	Ethylene glycol	Propylene glycol	Triethylene glycol	
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL				1	1	1	1	1	1	1	1	1	3	3	10	10	3	10	10	30	10	100	30	3	10	3	30	6	30	100	3	100	20000	20000	20000	20000
Monitoring Round		Field ID	Sampled Date	Lab Reports																																
Sep-21		EMB13	23/09/2021	827604 & ES2134300																																
		EMB14																																		

Groundwater Monitoring Results Table
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				PFAS - Perfluoroalkyl carboxylic acids (PFCAs)											PFAS - Perfluoroalkyl sulfonamido substances								PFAS - Perfluoroalkyl sulfonic acids (PFSAs)									
				Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoDA)	Perfluorotridecanoic acid (PFTriDA)	Perfluorotetradecanoic acid (PFTeDA)	2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	Perfluorooctane sulfonamide (FOSA)	Perfluorobutanesulfonic acid (PFBS)	Perfluoronanesulfonic acid (PFNS)	Perfluoropropanesulfonic acid (PFPrS)	Perfluoropentanesulfonic acid (PFPeS)	Perfluorohexanesulfonic acid (PFHxS)	Perfluoroheptanesulfonic acid (PFHpS)	Perfluorooctanesulfonic acid (PFOS)	Perfluorodecanesulfonic acid (PFDS)			
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L		
EQL				0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01			
Monitoring Round		Field ID	Sampled Date	Lab Reports																												
Sep-21		EMB13	23/09/2021	827604 & ES2134300	1	5.5	5.4	1.7	1.2	0.04	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			
		EMB14			0.56	1.4	1.1	1.0	0.29	0.1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01		

**Groundwater Monitoring Results Table
September 2021**

				PFAS - n:2 Fluorotelomer sulfonic acids (n:2 FTSA)				PFASs Summations				
				1H,1H,2H,2H-perfluorohexanesulfonic acid (4:2 FTSA)	1H,1H,2H,2H-perfluorooctanesulfonic acid (6:2 FTSA)	1H,1H,2H,2H-perfluorodecanesulfonic acid (8:2 FTSA)	1H,1H,2H,2H-perfluorododecanesulfonic acid (10:2 FTSA)	Sum (PFHxS + PFOS)	Sum of US EPA PFAS (PFOS + PFOA)	Sum of enHealth PFAS (PFHxS + PFOS + PFOA)	Sum of WA DWER PFAS (n=10)	Sum of PFASs (n=30)
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL				0.01	0.05	0.01	0.01	0.01	0.01	0.01	0.05	0.1
Monitoring Round	Field ID	Sampled Date	Lab Reports									
Sep-21	EMB13	23/09/2021	827604 & ES2134300	0.04	40	61	< 0.01	<0.01	1.2	1.2	55.41	55.49
	EMB14			<0.01	<0.05	<0.01	< 0.01	<0.01	0.29	0.29	4.35	4.45

			SDG Field ID Sampled Date/Time	23-Sep-21 EMB13 23/09/2021	23-Sep-21 QC01 23/09/2021	RPD	23-Sep-21 EMB13 23/09/2021	ALSE-Sydney 24-Sep-21 QC01A 23/09/2021	RPD
Chem_Group	ChemName	Units	EQL						
BTEX	Benzene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Ethylbenzene	µg/l	1 (Primary): 2 (Interlab)	<1.0	<1.0	0	<1.0	<2.0	0
	Toluene	µg/l	1 (Primary): 2 (Interlab)	<1.0	<1.0	0	<1.0	<2.0	0
	Xylene (m & p)	µg/l	2	<2.0	<2.0	0	<2.0	<2.0	0
	Xylene (o)	µg/l	1 (Primary): 2 (Interlab)	<1.0	<1.0	0	<1.0	<2.0	0
	Xylene Total	µg/l	3 (Primary): 2 (Interlab)	<3.0	<3.0	0	<3.0	<2.0	0
	C6-C10 less BTEX (F1)	mg/l	0.02	<0.02	<0.02	0	<0.02	<0.02	0
Halogenated Phenols	2,4,5-trichlorophenol	µg/l	10 (Primary): 1 (Interlab)	<10.0	<10.0	0	<10.0	<1.0	0
	2,4,6-trichlorophenol	µg/l	10 (Primary): 1 (Interlab)	<10.0	<10.0	0	<10.0	<1.0	0
	2,4-dichlorophenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	2,6-dichlorophenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	2-chlorophenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	Pentachlorophenol	µg/l	10 (Primary): 2 (Interlab)	<10.0	<10.0	0	<10.0	<2.0	0
	tetrachlorophenols	µg/l	30	<30.0	<30.0	0	<30.0		
Herbicides	Dinoseb	µg/l	100	<100.0	<100.0	0	<100.0		
PAH	Benzo(b)fluoranthene	mg/l	0.001	<0.001	<0.001	0	<0.001	<0.001	0
PAH/Phenols	2,4-dimethylphenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	2,4-dinitrophenol	mg/l	0.03	<0.03	<0.03	0	<0.03		
	2-methylphenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	2-nitrophenol	µg/l	10 (Primary): 1 (Interlab)	<10.0	<10.0	0	<10.0	<1.0	0
	3-&4-methylphenol	µg/l	6	<6.0	<6.0	0	<6.0		
	4,6-Dinitro-2-methylphenol	µg/l	30	<30.0	<30.0	0	<30.0		
	4-chloro-3-methylphenol	µg/l	10 (Primary): 1 (Interlab)	<10.0	<10.0	0	<10.0	<1.0	0
	4-nitrophenol	µg/l	30	<30.0	<30.0	0	<30.0		
	Acenaphthene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Acenaphthylene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Anthracene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Benzo(a)anthracene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Benzo(a)pyrene	µg/l	1 (Primary): 0.5 (Interlab)	<1.0	<1.0	0	<1.0	<0.5	0
	Benzo(g,h,i)perylene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Benzo(k)fluoranthene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Chrysene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Cresol Total	mg/l	0.01	<0.01	<0.01	0	<0.01		
	Dibenz(a,h)anthracene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Fluoranthene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Fluorene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Indeno(1,2,3-c,d)pyrene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Naphthalene	µg/l	10 (Primary): 5 (Interlab)	<10.0	<10.0	0	<10.0	<1.0	0
	Naphthalene	µg/l	1 (Primary): 5 (Interlab)	<1.0	<1.0	0	<1.0	<1.0	0
	PAHs (Sum of total)	µg/l	1 (Primary): 0.5 (Interlab)	<1.0	<1.0	0	<1.0	<0.5	0
	Phenanthrene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Phenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	Pyrene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
Phenolics	4,6-Dinitro-o-cyclohexyl phenol	µg/l	100	<100.0	<100.0	0	<100.0		
	Phenols (Total Halogenated)	mg/l	0.01	<0.01	<0.01	0	<0.01		
	Phenols (Total Non Halogenated)	mg/l	0.1	<0.1	<0.1	0	<0.1		
TPH	C10-C16	mg/l	0.05 (Primary): 0.1 (Interlab)	<0.05	<0.05	0	<0.05	<0.1	0
	C16-C34	mg/l	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	C34-C40	mg/l	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	F2-NAPHTHALENE	mg/l	0.05 (Primary): 0.1 (Interlab)	<0.05	<0.05	0	<0.05	<0.1	0
	+C10 - C36 (Sum of total)	µg/l	100 (Primary): 50 (Interlab)	<100.0	<100.0	0	<100.0	<50.0	0
	C6 - C9	µg/l	20	<20.0	<20.0	0	<20.0	<20.0	0
	C10 - C14	µg/l	50	<50.0	<50.0	0	<50.0	<50.0	0
	C15 - C28	µg/l	100	<100.0	<100.0	0	<100.0	<100.0	0
	C29-C36	µg/l	100 (Primary): 50 (Interlab)	<100.0	<100.0	0	<100.0	<50.0	0
	C10 - C40 (Sum of total)	µg/l	100	<100.0	<100.0	0	<100.0	<100.0	0
	C6-C10	mg/l	0.02	<0.02	<0.02	0	<0.02	<0.02	0

			SDG Field ID	23-Sep-21 RB01	23-Sep-21 TB01
			Sampled_Date/Time	23/09/2021	23/09/2021
			Sample Type	Rinsate	Trip_B
Chem_Group	ChemName	Units	EQL		
	3/4-Methylphenol (m/p-cresol)	mg/l	0.002		
	Perfluorooctanoate	mg/l	0.00001		
BTEX	Benzene	µg/l	1		<1
	Ethylbenzene	µg/l	1		<1
	Toluene	µg/l	1		<1
	Total BTEX	mg/l	0.001		
	Xylene (m & p)	µg/L	2		<2
	Xylene (o)	µg/l	1		<1
	Xylene Total	µg/l	2		<3
	C6-C10 less BTEX (F1)	mg/l	0.02		
Lead	Lead	mg/l	0.001	<0.001	
	Lead (Filtered)	mg/l	0.001		
Metals	Antimony (Filtered)	mg/l	0.001		
	Arsenic	mg/l	0.001	<0.001	
	Arsenic (Filtered)	mg/l	0.001		
	Barium (Filtered)	mg/l	0.001		
	Beryllium (Filtered)	mg/l	0.001		
	Boron (Filtered)	mg/l	0.05		
	Cadmium	mg/l	0.0002	<0.0002	
	Cadmium (Filtered)	mg/l	0.0001		
	Calcium	mg/l	0.5		
	Chromium (III+VI)	mg/l	0.001	<0.001	
	Chromium (III+VI) (Filtered)	mg/l	0.001		
	Cobalt (Filtered)	mg/l	0.001		
	Copper	mg/l	0.001	<0.001	
	Copper (Filtered)	mg/l	0.001		
	Magnesium	mg/l	0.5		
	Manganese (Filtered)	mg/l	0.001		
	Mercury	mg/l	0.0001	<0.0001	
	Mercury (Filtered)	mg/l	0.0001		
	Nickel	mg/l	0.001	<0.001	
	Nickel (Filtered)	mg/l	0.001		
	Phosphorus	mg/l	0.01		
	Potassium	mg/l	0.5		
	Selenium (Filtered)	mg/l	0.01		
	Vanadium (Filtered)	mg/l	0.01		
	Zinc	mg/l	0.005	<0.005	
	Zinc (Filtered)	mg/l	0.005		
PAH	Naphthalene	µg/l	1		<10
	PAHs (Sum of total)	µg/l	0.5		
	Phenanthrene	µg/l	1		
	Phenol	µg/l	1		
	Pyrene	µg/L	1		



Groundwater Monitoring Event – September 2021

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Appendix A: Environmental Protection Licence 229-01



Groundwater Monitoring Event – September 2021

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Appendix B: Laboratory Certificates of Analysis



CHAIN OF CUSTODY RECORD

Eurofins | Environmental Testing | ABN 50 005 065 521

Sydney Laboratory
Unit F3 Bldg F 16 Mars Road Laha Cove West NSW 2088
02 9900 8400 EnviroSampleNSW@eurofins.com

Brisbane Laboratory
Unit 1 21 Smallwood Place Murarie QLD 4172
07 3302 4603 EnviroSampleQLD@eurofins.com

Perth Laboratory
Unit 2 91 Leach Highway Kewdale WA 6105
08 9251 9500 EnviroSampleWA@eurofins.com

Melbourne Laboratory
6 Monterey Road Dandenong South VIC 3175
03 8594 5000 EnviroSampleVIC@eurofins.com

Company		Greencap NT P/L		Project No		J174438		Project Manager		Varun Bhagwat		Sampler(s)		VB															
Address		Unit 11 / 14 Winnellie Road Winnellie, NT 0820		Project Name		Groundwater Monitoring		EDD Format		Eedat		Facility Code		Handed over by															
Contact Name		Varun Bhagwat		Analysis Where results are reported (where specify "Due to" or "Based on") NOTE: Only used by audit to identify SUIE policy.		B11C: Cation Suite		B11E: Anion Suite		B11A: Nutrient Suite		Artenia		PCB		PFAS		Total Cyanide		BAA: TRH/TE/MPA/Phenols		MB: Metals (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg)		BTEX		Email for Invoice		Varun.Bha@greencap.com.au	
Phone No		0428 829 444																								Email for Results		Varun.Bha@greencap.com.au	
Special Directions																													
Purchase Order		PO292549																											
Quote ID No																													
No		Client Sample ID		Sampled Date/Time		Matrix																							
1		EMB13		23/09/21		Water		X		X		X		X		X		X		X		X		X		X		X	
2		EMB14		23/09/21		Water		X		X		X		X		X		X		X		X		X		X		X	
3		QC01		23/09/21		Water																							
4		RB01		23/09/21		Water																							
5		TB01		23/09/21		Water																							
		Add Rows				Total Counts		2		2		2		2		2		2		2		3		1		1			
Method or Shipment		= Courier (#		)		Hand Delivered		Postal		Name		Signature		Date		Time		Temperature											
Laboratory Use Only		Received By				SYD BNE MEL PER ADL NTL DRW		Signature		Date		Time		Temperature		Report No													
		Received By				SYD BNE MEL PER ADL NTL DRW		Signature		Date		Time		Report No															

Eurofins Environmental Testing Australia Pty Ltd

Submission of samples to the laboratory will be deemed as acceptance of Eurofins | mgf Standard Terms and Conditions unless agreed otherwise. A copy of Eurofins | mgf Standard Terms and Conditions is available on request.

827604
L. Bugeja

J174436 - COC with Testing**Varun Bhagwat** <Varun.Bhagwat@greencap.com.au>

Thu 23/09/2021 4:32 PM

To: Michael Morrison <MichaelMorrison@eurofins.com>

Cc: #AU09_EnviroSampleDRW <EnviroSampleDRW@eurofins.com>; #AU_CAU001_EnviroSampleVic <EnviroSampleVic@eurofins.com>

EXTERNAL EMAIL*

Hi Michael,

Attached is the COC with testing for water samples collected on 23/9/2021 for the project: **J174436**.

The samples were delivered to the Darwin Eurofins drop off point on 23/9/2021.

Thank you.

Cheers,

Varun Bhagwat

Environmental Consultant | Greencap

Unit 11 / 14 Winnellie Road Winnellie, NT 0820

M: 0428 829 444 | E: Varun.Bhagwat@greencap.com.au | in: [LinkedIn](#)827604
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Sample Receipt Advice

Company name: Greencap NT P/L
Contact name: Varun
Project name: groundwater monitoring
Project ID: J174436
Turnaround time: 6 Day
Date/Time received: Sep 23, 2021 4:32 PM
Eurofins reference: 827604

Sample Information

- ✓ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ✓ All samples have been received as described on the above COC.
- ✓ COC has been completed correctly.
- N/A Attempt to chill was evident.
- ✓ Appropriately preserved sample containers have been used.
- ✓ All samples were received in good condition.
- ✓ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ✓ Appropriate sample containers have been used.
- ✓ Sample containers for volatile analysis received with zero headspace.
- ✗ Split sample sent to requested external lab.
- ✗ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Notes

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Michael Morrison on phone : 03 8564 5933 or by email: MichaelMorrison@eurofins.com

Results will be delivered electronically via email to Varun - varun.bhagwat@greencap.com.au.

Note: A copy of these results will also be delivered to the general Greencap NT P/L email address.

Greencap NT P/L
11/14 Winnellie Road
Winnellie
NT 0800



NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention: Varun

Report 827604-W
Project name groundwater monitoring
Project ID J174436
Received Date Sep 23, 2021

Client Sample ID			EMB13 Water M21-Se53724 Sep 23, 2021	EMB14 Water M21-Se53725 Sep 23, 2021	QC01 Water M21-Se53726 Sep 23, 2021	RB01 Water M21-Se53727 Sep 23, 2021
Sample Matrix						
Eurofins Sample No.						
Date Sampled						
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	-
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	-
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
Naphthalene ^{N02}	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	-
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	< 0.02	< 0.02	< 0.02	-
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	-
TRH >C10-C16 less Naphthalene (F2) ^{N01}	0.05	mg/L	< 0.05	< 0.05	< 0.05	-
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	-
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
4-Bromofluorobenzene (surr.)	1	%	123	107	110	-
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Benzo(b&j)fluoranthene ^{N07}	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Indeno(1,2,3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-

Client Sample ID			EMB13 Water M21-Se53724 Sep 23, 2021	EMB14 Water M21-Se53725 Sep 23, 2021	QC01 Water M21-Se53726 Sep 23, 2021	RB01 Water M21-Se53727 Sep 23, 2021
Sample Matrix						
Eurofins Sample No.						
Date Sampled						
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
2-Fluorobiphenyl (surr.)	1	%	58	84	85	-
p-Terphenyl-d14 (surr.)	1	%	63	91	92	-
Polychlorinated Biphenyls						
Aroclor-1016	0.005	mg/L	< 0.005	< 0.005	-	-
Aroclor-1221	0.005	mg/L	< 0.005	< 0.005	-	-
Aroclor-1232	0.005	mg/L	< 0.005	< 0.005	-	-
Aroclor-1242	0.005	mg/L	< 0.005	< 0.005	-	-
Aroclor-1248	0.005	mg/L	< 0.005	< 0.005	-	-
Aroclor-1254	0.005	mg/L	< 0.005	< 0.005	-	-
Aroclor-1260	0.005	mg/L	< 0.005	< 0.005	-	-
Total PCB*	0.005	mg/L	< 0.005	< 0.005	-	-
Dibutylchloroendate (surr.)	1	%	75	107	-	-
Tetrachloro-m-xylene (surr.)	1	%	71	96	-	-
Phenols (Halogenated)						
2-Chlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
2,4-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
2,4,5-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
2,4,6-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
2,6-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
Pentachlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
Tetrachlorophenols - Total	0.03	mg/L	< 0.03	< 0.03	< 0.03	-
Total Halogenated Phenol*	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
Phenols (non-Halogenated)						
2-Cyclohexyl-4,6-dinitrophenol	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
2-Methyl-4,6-dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	-
2-Nitrophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
2,4-Dimethylphenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
2,4-Dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	-
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006	< 0.006	< 0.006	-
Total cresols*	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
4-Nitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	-
Dinoseb	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
Phenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
Phenol-d6 (surr.)	1	%	48	65	42	-
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
Ammonia (as N)	0.01	mg/L	0.09	0.09	-	-
Chloride	1	mg/L	77	67	-	-
Nitrate & Nitrite (as N)	0.05	mg/L	5.8	9.7	-	-
Phosphate total (as P)	0.01	mg/L	< 0.01	0.02	-	-
Sulphate (as SO4)	5	mg/L	< 5	< 5	-	-
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	0.5	1.5	-	-
Total Nitrogen (as N)*	0.2	mg/L	6.3	11.2	-	-

Client Sample ID			EMB13 Water M21-Se53724 Sep 23, 2021	EMB14 Water M21-Se53725 Sep 23, 2021	QC01 Water M21-Se53726 Sep 23, 2021	RB01 Water M21-Se53727 Sep 23, 2021
Sample Matrix						
Eurofins Sample No.						
Date Sampled						
Test/Reference	LOR	Unit				
Alkalinity (speciated)						
Bicarbonate Alkalinity (as CaCO ₃)	20	mg/L	< 20	< 20	-	-
Carbonate Alkalinity (as CaCO ₃)	10	mg/L	< 10	< 10	-	-
Hydroxide Alkalinity (as CaCO ₃)	20	mg/L	< 20	< 20	-	-
Total Alkalinity (as CaCO ₃)	20	mg/L	< 20	< 20	-	-
Alkali Metals						
Calcium	0.5	mg/L	1.0	12	-	-
Magnesium	0.5	mg/L	0.8	2.3	-	-
Potassium	0.5	mg/L	1.0	3.6	-	-
Sodium	0.5	mg/L	18	18	-	-
Perfluoroalkyl carboxylic acids (PFCAs)						
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	1.0	0.56	-	-
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	5.5	1.4	-	-
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	5.4	1.1	-	-
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.01	ug/L	^{N09} 1.7	1.00	-	-
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	1.2	0.29	-	-
Perfluorononanoic acid (PFNA) ^{N11}	0.01	ug/L	0.04	0.10	-	-
Perfluorodecanoic acid (PFDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluoroundecanoic acid (PFUnDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorododecanoic acid (PFDoDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorotridecanoic acid (PFTeDA) ^{N15}	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	-	-
13C4-PFBA (surr.)	1	%	69	69	-	-
13C5-PFPeA (surr.)	1	%	124	66	-	-
13C5-PFHxA (surr.)	1	%	109	59	-	-
13C4-PFHpA (surr.)	1	%	105	71	-	-
13C8-PFOA (surr.)	1	%	72	70	-	-
13C5-PFNA (surr.)	1	%	89	82	-	-
13C6-PFDA (surr.)	1	%	66	68	-	-
13C2-PFUnDA (surr.)	1	%	64	55	-	-
13C2-PFDoDA (surr.)	1	%	57	85	-	-
13C2-PFTeDA (surr.)	1	%	92	55	-	-
Perfluoroalkyl sulfonamido substances						
Perfluorooctane sulfonamide (FOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	-	-
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	-	-
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	-	-
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE) ^{N11}	0.05	ug/L	< 0.05	< 0.05	-	-
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE) ^{N11}	0.05	ug/L	< 0.05	< 0.05	-	-
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	-	-
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	-	-
13C8-FOSA (surr.)	1	%	60	61	-	-
D3-N-MeFOSA (surr.)	1	%	52	102	-	-
D5-N-EtFOSA (surr.)	1	%	61	117	-	-
D7-N-MeFOSE (surr.)	1	%	51	96	-	-
D9-N-EtFOSE (surr.)	1	%	54	111	-	-
D5-N-EtFOSAA (surr.)	1	%	33	71	-	-
D3-N-MeFOSAA (surr.)	1	%	38	81	-	-

Client Sample ID			EMB13 Water M21-Se53724 Sep 23, 2021	EMB14 Water M21-Se53725 Sep 23, 2021	QC01 Water M21-Se53726 Sep 23, 2021	RB01 Water M21-Se53727 Sep 23, 2021
Sample Matrix						
Eurofins Sample No.						
Date Sampled						
Test/Reference	LOR	Unit				
Perfluoroalkyl sulfonic acids (PFASs)						
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorononanesulfonic acid (PFNS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluoropropanesulfonic acid (PFPrS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	-	-
13C3-PFBS (surr.)	1	%	82	84	-	-
18O2-PFHxS (surr.)	1	%	101	88	-	-
13C8-PFOS (surr.)	1	%	76	84	-	-
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)						
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	0.01	ug/L	0.04	< 0.01	-	-
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA) ^{N11}	0.05	ug/L	40	< 0.05	-	-
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	0.01	ug/L	0.61	< 0.01	-	-
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	-	-
13C2-4:2 FTSA (surr.)	1	%	105	92	-	-
13C2-6:2 FTSA (surr.)	1	%	99	76	-	-
13C2-8:2 FTSA (surr.)	1	%	146	101	-	-
13C2-10:2 FTSA (surr.)	1	%	57	51	-	-
PFASs Summations						
Sum (PFHxS + PFOS)*	0.01	ug/L	< 0.01	< 0.01	-	-
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	1.2	0.29	-	-
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	1.2	0.29	-	-
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	55.41	4.35	-	-
Sum of PFASs (n=30)*	0.1	ug/L	55.49	4.45	-	-
Heavy Metals						
Arsenic	0.001	mg/L	-	-	-	< 0.001
Cadmium	0.0002	mg/L	-	-	-	< 0.0002
Chromium	0.001	mg/L	-	-	-	< 0.001
Copper	0.001	mg/L	-	-	-	< 0.001
Lead	0.001	mg/L	-	-	-	< 0.001
Mercury	0.0001	mg/L	-	-	-	< 0.0001
Nickel	0.001	mg/L	-	-	-	< 0.001
Zinc	0.005	mg/L	-	-	-	< 0.005

Client Sample ID			TB01
Sample Matrix			Water
Eurofins Sample No.			M21-Se53728
Date Sampled			Sep 23, 2021
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons			
Naphthalene ^{NO2}	0.01	mg/L	< 0.01
BTEX			
Benzene	0.001	mg/L	< 0.001
Toluene	0.001	mg/L	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002
o-Xylene	0.001	mg/L	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003
4-Bromofluorobenzene (surr.)	1	%	107

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B4A			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Sep 28, 2021	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Sep 28, 2021	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Sep 28, 2021	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	Sep 28, 2021	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Melbourne	Sep 28, 2021	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (Halogenated)	Melbourne	Sep 28, 2021	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (non-Halogenated)	Melbourne	Sep 28, 2021	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Polychlorinated Biphenyls	Melbourne	Sep 28, 2021	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8082)			
Ammonia (as N)	Melbourne	Sep 28, 2021	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Eurofins Suite B11C: Na/K/Ca/Mg	Melbourne	Sep 28, 2021	180 Days
- Method: LTM-MET-3010 Alkali Metals by ICP-AES			
Metals M8	Melbourne	Sep 28, 2021	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins Suite B11E: Cl/SO4/Alkalinity			
Chloride	Melbourne	Sep 28, 2021	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
Sulphate (as SO4)	Melbourne	Sep 28, 2021	28 Days
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
Alkalinity (speciated)	Melbourne	Sep 28, 2021	14 Days
- Method: LTM-INO-4250 Alkalinity by Electrometric Titration			
Total Nitrogen Set (as N)			
Nitrate & Nitrite (as N)	Melbourne	Sep 28, 2021	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Total Kjeldahl Nitrogen (as N)	Melbourne	Sep 28, 2021	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Eurofins Suite B19A: Total N (TKN, NOx), Total P			
Phosphate total (as P)	Melbourne	Sep 28, 2021	28 Days
- Method: LTM-INO-4040 Phosphate by CFA			
Per- and Polyfluoroalkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs)	Melbourne	Sep 28, 2021	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Melbourne	Sep 28, 2021	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFASs)	Melbourne	Sep 28, 2021	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Melbourne	Sep 28, 2021	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
PFASs Summations	Melbourne	Sep 27, 2021	
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

Company Name:	Greencap NT P/L	Order No.:		Received:	Sep 23, 2021 4:32 PM
Address:	11/14 Winnellie Road Winnellie NT 0800	Report #:	827604	Due:	Oct 1, 2021
Project Name:	groundwater monitoring	Phone:	61 8 8984 4244	Priority:	5 Day
Project ID:	J174436	Fax:	61 8 8984 3105	Contact Name:	Varun

Eurofins Analytical Services Manager : Michael Morrison

Sample Detail						Ammonia (as N)	Polychlorinated Biphenyls	Metals M8	BTEX and Naphthalene	Eurofins Suite B4A	Eurofins Suite B19A: Total N (TKN, NOx), Total P	Eurofins Suite B11E: Cl/SO4/Alkalinity	Per- and Polyfluoroalkyl Substances (PFASs)	Eurofins Suite B11C: Na/K/Ca/Mg
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA # 1261 Site # 18217														
Brisbane Laboratory - NATA # 1261 Site # 20794														
Mayfield Laboratory - NATA # 1261 Site # 25079														
Perth Laboratory - NATA # 2377 Site # 2370														
External Laboratory														
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID									
1	EMB13	Sep 23, 2021		Water	M21-Se53724	X	X			X	X	X	X	X
2	EMB14	Sep 23, 2021		Water	M21-Se53725	X	X			X	X	X	X	X
3	QC01	Sep 23, 2021		Water	M21-Se53726					X				
4	RB01	Sep 23, 2021		Water	M21-Se53727			X						
5	TB01	Sep 23, 2021		Water	M21-Se53728				X					
Test Counts						2	2	1	1	3	2	2	2	2

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs..

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
Naphthalene	mg/L	< 0.01			0.01	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total*	mg/L	< 0.003			0.003	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/L	< 0.001			0.001	Pass	
Acenaphthylene	mg/L	< 0.001			0.001	Pass	
Anthracene	mg/L	< 0.001			0.001	Pass	
Benz(a)anthracene	mg/L	< 0.001			0.001	Pass	
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.001			0.001	Pass	
Benzo(g,h,i)perylene	mg/L	< 0.001			0.001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.001			0.001	Pass	
Chrysene	mg/L	< 0.001			0.001	Pass	
Dibenz(a,h)anthracene	mg/L	< 0.001			0.001	Pass	
Fluoranthene	mg/L	< 0.001			0.001	Pass	
Fluorene	mg/L	< 0.001			0.001	Pass	
Indeno(1,2,3-cd)pyrene	mg/L	< 0.001			0.001	Pass	
Naphthalene	mg/L	< 0.001			0.001	Pass	
Phenanthrene	mg/L	< 0.001			0.001	Pass	
Pyrene	mg/L	< 0.001			0.001	Pass	
Method Blank							
Polychlorinated Biphenyls							
Aroclor-1016	mg/L	< 0.005			0.005	Pass	
Aroclor-1221	mg/L	< 0.005			0.005	Pass	
Aroclor-1232	mg/L	< 0.005			0.005	Pass	
Aroclor-1242	mg/L	< 0.005			0.005	Pass	
Aroclor-1248	mg/L	< 0.005			0.005	Pass	
Aroclor-1254	mg/L	< 0.005			0.005	Pass	
Aroclor-1260	mg/L	< 0.005			0.005	Pass	
Total PCB*	mg/L	< 0.005			0.005	Pass	
Method Blank							
Phenols (Halogenated)							
2-Chlorophenol	mg/L	< 0.003			0.003	Pass	
2,4-Dichlorophenol	mg/L	< 0.003			0.003	Pass	
2,4,5-Trichlorophenol	mg/L	< 0.01			0.01	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
2,4,6-Trichlorophenol	mg/L	< 0.01			0.01	Pass	
2,6-Dichlorophenol	mg/L	< 0.003			0.003	Pass	
4-Chloro-3-methylphenol	mg/L	< 0.01			0.01	Pass	
Pentachlorophenol	mg/L	< 0.01			0.01	Pass	
Tetrachlorophenols - Total	mg/L	< 0.03			0.03	Pass	
Method Blank							
Phenols (non-Halogenated)							
2-Cyclohexyl-4,6-dinitrophenol	mg/L	< 0.1			0.1	Pass	
2-Methyl-4,6-dinitrophenol	mg/L	< 0.03			0.03	Pass	
2-Nitrophenol	mg/L	< 0.01			0.01	Pass	
2,4-Dimethylphenol	mg/L	< 0.003			0.003	Pass	
2,4-Dinitrophenol	mg/L	< 0.03			0.03	Pass	
2-Methylphenol (o-Cresol)	mg/L	< 0.003			0.003	Pass	
3&4-Methylphenol (m&p-Cresol)	mg/L	< 0.006			0.006	Pass	
Total cresols*	mg/L	-			0.01	N/A	
4-Nitrophenol	mg/L	< 0.03			0.03	Pass	
Dinoseb	mg/L	< 0.1			0.1	Pass	
Phenol	mg/L	< 0.003			0.003	Pass	
Total Non-Halogenated Phenol*	mg/L	< 0			0.1	Pass	
Method Blank							
Ammonia (as N)	mg/L	< 0.01			0.01	Pass	
Chloride	mg/L	< 1			1	Pass	
Nitrate & Nitrite (as N)	mg/L	< 0.05			0.05	Pass	
Phosphate total (as P)	mg/L	< 0.01			0.01	Pass	
Sulphate (as SO4)	mg/L	< 5			5	Pass	
Total Kjeldahl Nitrogen (as N)	mg/L	< 0.2			0.2	Pass	
Method Blank							
Alkalinity (speciated)							
Bicarbonate Alkalinity (as CaCO3)	mg/L	< 20			20	Pass	
Carbonate Alkalinity (as CaCO3)	mg/L	< 10			10	Pass	
Hydroxide Alkalinity (as CaCO3)	mg/L	< 20			20	Pass	
Total Alkalinity (as CaCO3)	mg/L	< 20			20	Pass	
Method Blank							
Alkali Metals							
Calcium	mg/L	< 0.5			0.5	Pass	
Magnesium	mg/L	< 0.5			0.5	Pass	
Potassium	mg/L	< 0.5			0.5	Pass	
Sodium	mg/L	< 0.5			0.5	Pass	
Method Blank							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	ug/L	< 0.05			0.05	Pass	
Perfluoropentanoic acid (PFPeA)	ug/L	< 0.01			0.01	Pass	
Perfluorohexanoic acid (PFHxA)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanoic acid (PFHpA)	ug/L	< 0.01			0.01	Pass	
Perfluorooctanoic acid (PFOA)	ug/L	< 0.01			0.01	Pass	
Perfluorononanoic acid (PFNA)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanoic acid (PFDA)	ug/L	< 0.01			0.01	Pass	
Perfluoroundecanoic acid (PFUnDA)	ug/L	< 0.01			0.01	Pass	
Perfluorododecanoic acid (PFDoDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotridecanoic acid (PFTTrDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotetradecanoic acid (PFTeDA)	ug/L	< 0.01			0.01	Pass	
Method Blank							
Perfluoroalkyl sulfonamido substances							
Perfluorooctane sulfonamide (FOSA)	ug/L	< 0.05			0.05	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	ug/L	< 0.05			0.05	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	ug/L	< 0.05			0.05	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	ug/L	< 0.05			0.05	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	ug/L	< 0.05			0.05	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	ug/L	< 0.05			0.05	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	ug/L	< 0.05			0.05	Pass	
Method Blank							
Perfluoroalkyl sulfonic acids (PFSA's)							
Perfluorobutanesulfonic acid (PFBS)	ug/L	< 0.01			0.01	Pass	
Perfluorononanesulfonic acid (PFNS)	ug/L	< 0.01			0.01	Pass	
Perfluoropropanesulfonic acid (PFPrS)	ug/L	< 0.01			0.01	Pass	
Perfluoropentanesulfonic acid (PFPeS)	ug/L	< 0.01			0.01	Pass	
Perfluorohexanesulfonic acid (PFHxS)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	ug/L	< 0.01			0.01	Pass	
Perfluorooctanesulfonic acid (PFOS)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanesulfonic acid (PFDS)	ug/L	< 0.01			0.01	Pass	
Method Blank							
n:2 Fluorotelomer sulfonic acids (n:2 FTSA's)							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	ug/L	< 0.05			0.05	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	ug/L	< 0.01			0.01	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons							
TRH C6-C9	%	101			70-130	Pass	
TRH C10-C14	%	74			70-130	Pass	
Naphthalene	%	103			70-130	Pass	
TRH C6-C10	%	94			70-130	Pass	
TRH >C10-C16	%	77			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	79			70-130	Pass	
Toluene	%	79			70-130	Pass	
Ethylbenzene	%	79			70-130	Pass	
m&p-Xylenes	%	78			70-130	Pass	
Xylenes - Total*	%	78			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	106			70-130	Pass	
Acenaphthylene	%	109			70-130	Pass	
Anthracene	%	73			70-130	Pass	
Benz(a)anthracene	%	114			70-130	Pass	
Benzo(a)pyrene	%	77			70-130	Pass	
Benzo(b&j)fluoranthene	%	108			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Benzo(g,h,i)perylene	%	107			70-130	Pass	
Benzo(k)fluoranthene	%	89			70-130	Pass	
Chrysene	%	86			70-130	Pass	
Dibenz(a,h)anthracene	%	105			70-130	Pass	
Fluoranthene	%	109			70-130	Pass	
Fluorene	%	100			70-130	Pass	
Indeno(1,2,3-cd)pyrene	%	99			70-130	Pass	
Naphthalene	%	122			70-130	Pass	
Phenanthrene	%	100			70-130	Pass	
Pyrene	%	112			70-130	Pass	
LCS - % Recovery							
Polychlorinated Biphenyls							
Aroclor-1260	%	97			70-130	Pass	
LCS - % Recovery							
Phenols (Halogenated)							
2-Chlorophenol	%	92			25-140	Pass	
2,4-Dichlorophenol	%	94			25-140	Pass	
2,4,5-Trichlorophenol	%	97			25-140	Pass	
2,4,6-Trichlorophenol	%	71			25-140	Pass	
2,6-Dichlorophenol	%	101			25-140	Pass	
4-Chloro-3-methylphenol	%	81			25-140	Pass	
Pentachlorophenol	%	77			25-140	Pass	
Tetrachlorophenols - Total	%	83			25-140	Pass	
LCS - % Recovery							
Phenols (non-Halogenated)							
2-Cyclohexyl-4,6-dinitrophenol	%	70			25-140	Pass	
2-Methyl-4,6-dinitrophenol	%	109			25-140	Pass	
2-Nitrophenol	%	119			25-140	Pass	
2,4-Dimethylphenol	%	74			25-140	Pass	
2,4-Dinitrophenol	%	65			25-140	Pass	
2-Methylphenol (o-Cresol)	%	39			25-140	Pass	
3&4-Methylphenol (m&p-Cresol)	%	89			25-140	Pass	
Total cresols*	%	64			25-140	Pass	
4-Nitrophenol	%	84			25-140	Pass	
Dinoseb	%	86			25-140	Pass	
Phenol	%	40			25-140	Pass	
LCS - % Recovery							
Ammonia (as N)	%	108			70-130	Pass	
Chloride	%	110			70-130	Pass	
Nitrate & Nitrite (as N)	%	117			70-130	Pass	
Phosphate total (as P)	%	109			70-130	Pass	
Sulphate (as SO4)	%	105			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	%	103			70-130	Pass	
LCS - % Recovery							
Alkalinity (speciated)							
Carbonate Alkalinity (as CaCO3)	%	100			70-130	Pass	
Total Alkalinity (as CaCO3)	%	102			70-130	Pass	
LCS - % Recovery							
Alkali Metals							
Calcium	%	105			80-120	Pass	
Magnesium	%	96			80-120	Pass	
Potassium	%	97			80-120	Pass	
Sodium	%	99			80-120	Pass	
LCS - % Recovery							

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Perfluoroalkyl carboxylic acids (PFCAs)									
Perfluorobutanoic acid (PFBA)			%	132			50-150	Pass	
Perfluoropentanoic acid (PFPeA)			%	90			50-150	Pass	
Perfluorohexanoic acid (PFHxA)			%	107			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)			%	100			50-150	Pass	
Perfluorooctanoic acid (PFOA)			%	135			50-150	Pass	
Perfluorononanoic acid (PFNA)			%	114			50-150	Pass	
Perfluorodecanoic acid (PFDA)			%	123			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)			%	110			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)			%	136			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)			%	116			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)			%	130			50-150	Pass	
LCS - % Recovery									
Perfluoroalkyl sulfonamido substances									
Perfluorooctane sulfonamide (FOSA)			%	118			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)			%	127			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)			%	126			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)			%	123			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)			%	134			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)			%	108			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)			%	76			50-150	Pass	
LCS - % Recovery									
Perfluoroalkyl sulfonic acids (PFSAs)									
Perfluorobutanesulfonic acid (PFBS)			%	105			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)			%	115			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)			%	137			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)			%	121			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)			%	118			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)			%	116			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)			%	142			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)			%	101			50-150	Pass	
LCS - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)									
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)			%	124			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)			%	86			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)			%	142			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)			%	135			50-150	Pass	
LCS - % Recovery									
Heavy Metals									
Arsenic			%	104			80-120	Pass	
Cadmium			%	108			80-120	Pass	
Chromium			%	100			80-120	Pass	
Copper			%	105			80-120	Pass	
Lead			%	108			80-120	Pass	
Mercury			%	96			80-120	Pass	
Nickel			%	104			80-120	Pass	
Zinc			%	106			80-120	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons				Result 1					
TRH C10-C14	S21-Se57286	NCP	%	114			70-130	Pass	
TRH >C10-C16	S21-Se57286	NCP	%	118			70-130	Pass	
Spike - % Recovery									

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	B21-Se32725	NCP	%	89			70-130	Pass	
Acenaphthylene	B21-Se32725	NCP	%	60			70-130	Fail	Q08
Benz(a)anthracene	B21-Se32725	NCP	%	90			70-130	Pass	
Benzo(a)pyrene	B21-Se32725	NCP	%	75			70-130	Pass	
Benzo(b&j)fluoranthene	B21-Se32725	NCP	%	87			70-130	Pass	
Benzo(g,h,i)perylene	B21-Se32725	NCP	%	76			70-130	Pass	
Benzo(k)fluoranthene	B21-Se32725	NCP	%	103			70-130	Pass	
Chrysene	B21-Se32725	NCP	%	98			70-130	Pass	
Dibenz(a,h)anthracene	B21-Se32725	NCP	%	80			70-130	Pass	
Fluoranthene	B21-Se32725	NCP	%	83			70-130	Pass	
Fluorene	B21-Se32725	NCP	%	88			70-130	Pass	
Indeno(1,2,3-cd)pyrene	B21-Se32725	NCP	%	85			70-130	Pass	
Naphthalene	B21-Se32725	NCP	%	81			70-130	Pass	
Phenanthrene	B21-Se32725	NCP	%	81			70-130	Pass	
Pyrene	B21-Se32725	NCP	%	86			70-130	Pass	
Spike - % Recovery									
Phenols (Halogenated)				Result 1					
2-Chlorophenol	B21-Se32725	NCP	%	63			30-130	Pass	
2,4-Dichlorophenol	B21-Se32725	NCP	%	74			30-130	Pass	
2,4,5-Trichlorophenol	B21-Se32725	NCP	%	53			30-130	Pass	
2,4,6-Trichlorophenol	B21-Se32725	NCP	%	54			30-130	Pass	
2,6-Dichlorophenol	B21-Se32725	NCP	%	70			30-130	Pass	
4-Chloro-3-methylphenol	B21-Se32725	NCP	%	42			30-130	Pass	
Pentachlorophenol	B21-Se32725	NCP	%	56			30-130	Pass	
Tetrachlorophenols - Total	B21-Se32725	NCP	%	56			30-130	Pass	
Spike - % Recovery									
Phenols (non-Halogenated)				Result 1					
2-Cyclohexyl-4,6-dinitrophenol	B21-Se32725	NCP	%	70			30-130	Pass	
2-Methyl-4,6-dinitrophenol	B21-Se32725	NCP	%	62			30-130	Pass	
2-Nitrophenol	B21-Se32725	NCP	%	72			30-130	Pass	
2,4-Dinitrophenol	B21-Se32725	NCP	%	40			30-130	Pass	
2-Methylphenol (o-Cresol)	B21-Se32725	NCP	%	55			30-130	Pass	
3&4-Methylphenol (m&p-Cresol)	B21-Se32725	NCP	%	65			30-130	Pass	
Total cresols*	B21-Se32725	NCP	%	120			70-130	Pass	
4-Nitrophenol	B21-Se32725	NCP	%	42			30-130	Pass	
Dinoseb	B21-Se32725	NCP	%	60			30-130	Pass	
Phenol	B21-Se32725	NCP	%	61			30-130	Pass	
Spike - % Recovery									
				Result 1					
Ammonia (as N)	M21-Se44900	NCP	%	91			70-130	Pass	
Chloride	M21-Se47566	NCP	%	96			70-130	Pass	
Nitrate & Nitrite (as N)	B21-Se50115	NCP	%	105			70-130	Pass	
Phosphate total (as P)	B21-Se46981	NCP	%	116			70-130	Pass	
Sulphate (as SO4)	L21-Se49532	NCP	%	85			70-130	Pass	
Spike - % Recovery									
Alkali Metals				Result 1					
Calcium	M21-Se57884	NCP	%	105			75-125	Pass	
Magnesium	M21-Se57884	NCP	%	108			75-125	Pass	
Potassium	M21-Se57884	NCP	%	96			75-125	Pass	
Sodium	B21-Se49943	NCP	%	104			75-125	Pass	
Spike - % Recovery									
Perfluoroalkyl carboxylic acids (PFCA's)				Result 1					
Perfluorobutanoic acid (PFBA)	M21-Se53724	CP	%	135			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Perfluorooctanoic acid (PFOA)	M21-Se53724	CP	%	124			50-150	Pass	
Perfluorononanoic acid (PFNA)	M21-Se53724	CP	%	120			50-150	Pass	
Perfluorodecanoic acid (PFDA)	M21-Se53724	CP	%	121			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	M21-Se53724	CP	%	133			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	M21-Se53724	CP	%	139			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	M21-Se53724	CP	%	102			50-150	Pass	
Perfluorotetradecanoic acid (PFTEdA)	M21-Se53724	CP	%	62			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances				Result 1					
Perfluorooctane sulfonamide (FOSA)	M21-Se53724	CP	%	125			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M21-Se53724	CP	%	136			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M21-Se53724	CP	%	124			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	M21-Se53724	CP	%	125			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	M21-Se53724	CP	%	139			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M21-Se53724	CP	%	129			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M21-Se53724	CP	%	103			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFSA's)				Result 1					
Perfluorobutanesulfonic acid (PFBS)	M21-Se53724	CP	%	110			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	M21-Se53724	CP	%	107			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M21-Se53724	CP	%	103			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M21-Se53724	CP	%	108			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M21-Se53724	CP	%	125			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M21-Se53724	CP	%	112			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	M21-Se53724	CP	%	117			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	M21-Se53724	CP	%	91			50-150	Pass	
Spike - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA's)				Result 1					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M21-Se53724	CP	%	123			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M21-Se57015	NCP	%	136			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M21-Se53724	CP	%	150			50-150	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	M21-Se51020	NCP	%	79			75-125	Pass	
Cadmium	M21-Se51020	NCP	%	81			75-125	Pass	
Chromium	M21-Se51020	NCP	%	78			75-125	Pass	
Copper	M21-Se47629	NCP	%	101			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Lead	M21-Se47629	NCP	%	102			75-125	Pass	
Mercury	M21-Se51020	NCP	%	75			75-125	Pass	
Nickel	M21-Se51020	NCP	%	82			75-125	Pass	
Zinc	L21-Se49539	NCP	%	105			75-125	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C10-C14	M21-Oc01210	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	M21-Oc01210	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	M21-Oc01210	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C10-C16	M21-Oc01210	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH >C16-C34	M21-Oc01210	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C34-C40	M21-Oc01210	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	M21-Se56631	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Acenaphthylene	M21-Se56631	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Anthracene	M21-Se56631	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benz(a)anthracene	M21-Se56631	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(a)pyrene	M21-Se56631	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(b&j)fluoranthene	M21-Se56631	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(g,h,i)perylene	M21-Se56631	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(k)fluoranthene	M21-Se56631	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Chrysene	M21-Se56631	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Dibenz(a,h)anthracene	M21-Se56631	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluoranthene	M21-Se56631	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluorene	M21-Se56631	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Indeno(1,2,3-cd)pyrene	M21-Se56631	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Naphthalene	M21-Se56631	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Phenanthrene	M21-Se56631	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Pyrene	M21-Se56631	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Duplicate									
Polychlorinated Biphenyls				Result 1	Result 2	RPD			
Aroclor-1016	M21-Se56631	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1221	M21-Se56631	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1232	M21-Se56631	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1242	M21-Se56631	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1248	M21-Se56631	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1254	M21-Se56631	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1260	M21-Se56631	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Total PCB*	M21-Se56631	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Phenols (Halogenated)				Result 1	Result 2	RPD			
2-Chlorophenol	M21-Se56631	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
2,4-Dichlorophenol	M21-Se56631	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
2,4,5-Trichlorophenol	M21-Se56631	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
2,4,6-Trichlorophenol	M21-Se56631	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
2,6-Dichlorophenol	S21-Se57285	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
4-Chloro-3-methylphenol	M21-Se56631	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Pentachlorophenol	M21-Se56631	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Tetrachlorophenols - Total	M21-Se56631	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass	

Duplicate								
Phenols (non-Halogenated)				Result 1	Result 2	RPD		
2-Cyclohexyl-4,6-dinitrophenol	M21-Se56631	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass
2-Methyl-4,6-dinitrophenol	M21-Se56631	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass
2-Nitrophenol	M21-Se56631	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass
2,4-Dimethylphenol	M21-Se56631	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass
2,4-Dinitrophenol	M21-Se56631	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass
2-Methylphenol (o-Cresol)	M21-Se56631	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass
3&4-Methylphenol (m&p-Cresol)	M21-Se56631	NCP	mg/L	< 0.006	< 0.006	<1	30%	Pass
Total cresols*	S21-Se57285	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass
4-Nitrophenol	M21-Se56631	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass
Dinoseb	M21-Se56631	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Ammonia (as N)	M21-Se44900	NCP	mg/L	9.1	9.1	1.0	30%	Pass
Chloride	L21-Se49532	NCP	mg/L	930	1100	16	30%	Pass
Nitrate & Nitrite (as N)	M21-Se49703	NCP	mg/L	8.5	8.1	5.0	30%	Pass
Phosphate total (as P)	M21-Se53724	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass
Sulphate (as SO ₄)	L21-Se49532	NCP	mg/L	120	120	2.0	30%	Pass
Duplicate								
Alkalinity (speciated)				Result 1	Result 2	RPD		
Bicarbonate Alkalinity (as CaCO ₃)	M21-Se57754	NCP	mg/L	340	340	<1	30%	Pass
Carbonate Alkalinity (as CaCO ₃)	M21-Se57754	NCP	mg/L	< 10	< 10	<1	30%	Pass
Hydroxide Alkalinity (as CaCO ₃)	M21-Se57754	NCP	mg/L	< 20	< 20	<1	30%	Pass
Total Alkalinity (as CaCO ₃)	M21-Se57754	NCP	mg/L	340	340	<1	30%	Pass
Duplicate								
Alkali Metals				Result 1	Result 2	RPD		
Calcium	M21-Se57884	NCP	mg/L	120	120	<1	30%	Pass
Magnesium	M21-Se57884	NCP	mg/L	62	60	2.0	30%	Pass
Potassium	M21-Se57884	NCP	mg/L	7.7	6.9	11	30%	Pass
Sodium	B21-Se49943	NCP	mg/L	140	140	2.0	30%	Pass
Duplicate								
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1	Result 2	RPD		
Perfluorobutanoic acid (PFBA)	M21-Se51942	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
Perfluoropentanoic acid (PFPeA)	K21-Se49103	NCP	ug/L	0.04	0.04	6.0	30%	Pass
Perfluorohexanoic acid (PFHxA)	K21-Se49103	NCP	ug/L	0.04	0.04	2.0	30%	Pass
Perfluoroheptanoic acid (PFHpA)	K21-Se49103	NCP	ug/L	0.01	0.01	4.0	30%	Pass
Perfluorooctanoic acid (PFOA)	M21-Se51942	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorononanoic acid (PFNA)	M21-Se51942	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorodecanoic acid (PFDA)	M21-Se51942	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoroundecanoic acid (PFUnDA)	M21-Se51942	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorododecanoic acid (PFDoDA)	M21-Se51942	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorotridecanoic acid (PFTrDA)	M21-Se51942	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorotetradecanoic acid (PFTeDA)	M21-Se51942	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Duplicate								
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD		
Perfluorooctane sulfonamide (FOSA)	M21-Se51942	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M21-Se51942	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M21-Se51942	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	M21-Se51942	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass

Duplicate								
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD		
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	M21-Se51942	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M21-Se51942	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M21-Se51942	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
Duplicate								
Perfluoroalkyl sulfonic acids (PFSA's)				Result 1	Result 2	RPD		
Perfluorobutanesulfonic acid (PFBS)	M21-Se51942	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorononanesulfonic acid (PFNS)	M21-Se51942	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropropanesulfonic acid (PFPrS)	M21-Se51942	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropentanesulfonic acid (PFPeS)	M21-Se51942	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorohexanesulfonic acid (PFHxS)	M21-Se51942	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoroheptanesulfonic acid (PFHpS)	M21-Se51942	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorooctanesulfonic acid (PFOS)	M21-Se51942	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorodecanesulfonic acid (PFDS)	M21-Se51942	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Duplicate								
n:2 Fluorotelomer sulfonic acids (n:2 FTSA's)				Result 1	Result 2	RPD		
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M21-Se51942	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	K21-Se49103	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M21-Se51942	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M21-Se51942	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Arsenic	M21-Se51020	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Cadmium	M21-Se51020	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Chromium	M21-Se51020	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Copper	M21-Se47629	NCP	mg/L	0.014	0.013	4.0	30%	Pass
Lead	M21-Se51020	NCP	mg/L	< 0.001	rep	n/a	30%	Pass
Mercury	M21-Se51020	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Nickel	M21-Se51020	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Zinc	L21-Se49539	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	N/A
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
N09	Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).
Q08	The matrix spike recovery is outside of the recommended acceptance criteria. An acceptable recovery was obtained for the laboratory control sample indicating a sample matrix interference.

Authorised by:

Harry Bacalis	Analytical Services Manager
Vivian Wang	Senior Analyst-Volatile (VIC)
Scott Beddoes	Senior Analyst-Inorganic (VIC)
Joseph Edouard	Senior Analyst-Organic (VIC)
Emily Rosenberg	Senior Analyst-Metal (VIC)
Joseph Edouard	Senior Analyst-PFAS (VIC)



Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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Client	GRR	Date	23/09/2021
Project	Groundwater Monitoring	Sampled by	Varun Bhagwat
Project Manager	Varun Bhagwat	Sampler Mobile	0428 829 444
Job No.	J174436	Purchase Order	PO292545
Location	800 Berrimah Rd, East Arm	T/Around	***STANDARD TAT***

Please email results to: Varun.Bhagwat@greencap.com.au

Relinquished by: VB on 23/9/21	Received by: <i>Asad my</i>	Relinquished by:	Received by:
Signature & date	Signature & date 23/09/21	Signature & date	Signature & date

Field ID	Depth	Sampled	Sample Containers										Testing											
			Matrix (Soil, Water, Vapour, etc)	40ml Vials (HCL preserved)	40ml Vials (for Glycols)	100ml Glass Amber (semi-volatile)	60ml Plastic (Nitric Acid Preserved)	60ml Plastic Nutrients (H ₂ SO ₄)	250ml Plastic (unpreserved)	60ml Ferrous Iron (HCL)	60ml Plastic - Cyanide/Hex Cr (NaOH)	250ml Plastic (PFOS/PFOA)	S-4 : TRH, BTEXN	Sb	W3: NEPM Suite: 15 Metals (As, B, Ba, Be, Cd, Cr, Co, Cu, Mn, Ni, Pb, Se, V, Zn, Hg)	Glycols (7 analytes)	W24: TRH/BTEXN/PAH/Phenols	P15/2 SA EPA Waste Screen	S-23 : VOC/SVOC	S12 : OCP, OPP	S-18: TRH (C6-C10) & BTEX	BTEXN	P-22: NEPM Screen for Soil Classification Screen	Hold
EMB13		23/09/2021	W		2		1							X										
EMB14		23/09/2021	W		2		1							X										
QC01A		23/09/2021	W	2		1										X								
Totals				2	4	1	2	0	0	0	0	0	0	2	2	2	1	0	0	0	0	0	0	0

Kim ALS
24.9.21
6.30am

Environmental Division
Sydney
Work Order Reference
ES2134300



Telephone : + 61-2-8784 9555

**LAB OF ORIGIN
DARWIN**

Subcon / Forward Lab / Split WO
Lab/ Analysis: Melbourne
Organised By / Date: Glycols: 1-2
Relinquished By / Date:
Connote / Courier:
WO No: ES2134300
Attach By PO / Internal Sheet:

FW: [EXT]:Eurofins Test Results, Invoice - Report 827604 : Site groundwater monitoring (J174436)

Michael Morrison <MichaelMorrison@eurofins.com>

Wed 13/10/2021 4:13 PM

To: #AU_CAU001_EnviroSampleVic <EnviroSampleVic@eurofins.com>; Catherine Wilson <CatherineWilson@eurofins.com>

Cc: Harry Bacalis <HarryBacalis@eurofins.com>

Hi Cahn

Please book this 1 day cyanide that was missed.

Catherine- please raise this with Luke.

Kind Regards,

Michael Morrison

Analytical Services Manager

Phone: 03 8564 5933

Mobile: 0499 201 025

Email : michaelmorrison@eurofins.com**From:** Varun Bhagwat <Varun.Bhagwat@greencap.com.au>**Sent:** Wednesday, 13 October 2021 4:06 PM**To:** Harry Bacalis <HarryBacalis@eurofins.com>; Michael Morrison <MichaelMorrison@eurofins.com>**Subject:** RE: [EXT]:Eurofins Test Results, Invoice - Report 827604 : Site groundwater monitoring (J174436)

EXTERNAL EMAIL*

Hi Harry/Michael,

Just an enquiry regarding this report, I requested Total Cyanide analysis on the COC but I can't see any cyanide results?

Regards,

Se 53724
53725831812
L. Pong**Varun Bhagwat**

Environmental Consultant | Greencap

Unit 11 / 14 Winnellie Road Winnellie, NT 0820

M: 0428 829 444 | E: Varun.Bhagwat@greencap.com.au | in: [LinkedIn](#)**GREENCAP**
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NATA # 1261 Site # 1254

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NATA # 1261 Site # 20794

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IANZ # 1327

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43 Detroit Drive
Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Sample Receipt Advice

Company name: Greencap NT P/L
Contact name: Varun
Project name: GROUNDWATER MONITORING
Project ID: J174436
Turnaround time: 1 Day
Date/Time received: Oct 13, 2021 4:13 PM
Eurofins reference: 831812

Sample Information

- ✓ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ✓ All samples have been received as described on the above COC.
- ✓ COC has been completed correctly.
- N/A Attempt to chill was evident.
- ✓ Appropriately preserved sample containers have been used.
- ✓ All samples were received in good condition.
- ✓ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ✓ Appropriate sample containers have been used.
- ✓ Sample containers for volatile analysis received with zero headspace.
- ✗ Split sample sent to requested external lab.
- ✗ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Notes

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Michael Morrison on phone : 03 8564 5933 or by email: MichaelMorrison@eurofins.com

Results will be delivered electronically via email to Varun - varun.bhagwat@greencap.com.au.

Note: A copy of these results will also be delivered to the general Greencap NT P/L email address.

Greencap NT P/L
11/14 Winnellie Road
Winnellie
NT 0800



NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
 NATA is a signatory to the ILAC Mutual Recognition
 Arrangement for the mutual recognition of the
 equivalence of testing, medical testing, calibration,
 inspection, proficiency testing scheme providers and
 reference materials producers reports and certificates.

Attention: **Varun**

Report **831812-W**
 Project name **GROUNDWATER MONITORING**
 Project ID **J174436**
 Received Date **Oct 13, 2021**

Client Sample ID			EMB13	EMB14
Sample Matrix			Water	Water
Eurofins Sample No.			M21-Oc26841	M21-Oc26842
Date Sampled			Sep 23, 2021	Sep 23, 2021
Test/Reference	LOR	Unit		
Cyanide (total)	0.005	mg/L	0.006	< 0.005

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description

Cyanide (total)

Testing Site

Melbourne

Extracted

Oct 14, 2021

Holding Time

14 Days

- Method: LTM-INO-4020 Total Free WAD Cyanide by CFA

Company Name:	Greencap NT P/L	Order No.:		Received:	Oct 13, 2021 4:13 PM
Address:	11/14 Winnellie Road Winnellie NT 0800	Report #:	831812	Due:	Oct 14, 2021
Project Name:	GROUNDWATER MONITORING	Phone:	61 8 8984 4244	Priority:	1 Day
Project ID:	J174436	Fax:	61 8 8984 3105	Contact Name:	Varun
Eurofins Analytical Services Manager : Michael Morrison					

Sample Detail						Cyande (total)
Melbourne Laboratory - NATA # 1261 Site # 1254						X
Sydney Laboratory - NATA # 1261 Site # 18217						
Brisbane Laboratory - NATA # 1261 Site # 20794						
Mayfield Laboratory - NATA # 1261 Site # 25079						
Perth Laboratory - NATA # 2377 Site # 2370						
External Laboratory						
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID	
1	EMB13	Sep 23, 2021		Water	M21-Oc26841	X
2	EMB14	Sep 23, 2021		Water	M21-Oc26842	X
Test Counts						2

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs..

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Cyanide (total)			mg/L	< 0.005			0.005	Pass	
LCS - % Recovery									
Cyanide (total)			%	107			70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
				Result 1	Result 2	RPD			
Cyanide (total)	M21-Oc26389	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	

Comments
Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	N/A
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Michael Morrison
Scott Beddoes

Analytical Services Manager
Senior Analyst-Inorganic (VIC)



Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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QUALITY CONTROL REPORT

Work Order	: ES2134300	Page	: 1 of 8
Client	: GREENCAP-NAA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: VARUN BHAGWAT	Contact	: Shane Ellis
Address	: 11/14 Winnellie Road WINNELLIE NT, AUSTRALIA 0820	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61 2 8784 8555
Project	: J174436 Groundwater Monitoring	Date Samples Received	: 24-Sep-2021
Order number	: PO292545	Date Analysis Commenced	: 27-Sep-2021
C-O-C number	: ----	Issue Date	: 05-Oct-2021
Sampler	: VARUN BHAGWAT		
Site	: 800 Berrimah Rd, East Arm		
Quote number	: EN/222		
No. of samples received	: 3		
No. of samples analysed	: 3		



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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

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>
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC



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.

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 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
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3928790)									
ES2134941-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.006	0.007	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	0.26	0.26	0.0	No Limit
EW2104024-002	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.023	0.023	0.0	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3928790) - continued									
EW2104024-002	Anonymous	EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.039	0.038	4.2	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.013	0.013	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 3928791)									
ES2134300-002	EMB14	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EP067: Glycols (QC Lot: 3929025)									
ES2134289-001	Anonymous	EP067: 2-Ethoxyethyl acetate	111-15-9	2	mg/L	<2	<2	0.0	No Limit
		EP067: 2-Butoxyethanol	111-76-2	2	mg/L	<2	<2	0.0	No Limit
		EP067: Propylene glycol	57-55-6	2	mg/L	<2	<2	0.0	No Limit
		EP067: Ethylene glycol	107-21-1	2	mg/L	<2	<2	0.0	No Limit
		EP067: Diethylene glycol monobutyl ether	112-34-5	2	mg/L	<2	<2	0.0	No Limit
		EP067: Diethylene glycol	111-46-6	2	mg/L	<2	<2	0.0	No Limit
		EP067: Triethylene glycol	112-27-6	2	mg/L	<2	<2	0.0	No Limit
ES2134289-016	Anonymous	EP067: 2-Ethoxyethyl acetate	111-15-9	2	mg/L	<2	<2	0.0	No Limit
		EP067: 2-Butoxyethanol	111-76-2	2	mg/L	<2	<2	0.0	No Limit
		EP067: Propylene glycol	57-55-6	2	mg/L	<2	<2	0.0	No Limit
		EP067: Ethylene glycol	107-21-1	2	mg/L	<2	<2	0.0	No Limit
		EP067: Diethylene glycol monobutyl ether	112-34-5	2	mg/L	<2	<2	0.0	No Limit
		EP067: Diethylene glycol	111-46-6	2	mg/L	<2	<2	0.0	No Limit
		EP067: Triethylene glycol	112-27-6	2	mg/L	<2	<2	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3926733)									
ES2134300-003	QC01A	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES2134837-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3926733)									
ES2134300-003	QC01A	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES2134837-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 3926733)									
ES2134300-003	QC01A	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.0	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
ES2134837-001	Anonymous	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP080: BTEXN (QC Lot: 3926733) - continued									
ES2134837-001	Anonymous	EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.0	No Limit
		106-42-3							
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit



Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EG020F: Dissolved Metals by ICP-MS (QCLot: 3928790)								
EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	0.02 mg/L	96.0	70.0	130
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	94.0	85.0	114
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	89.9	85.0	115
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	95.1	82.0	110
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	94.1	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	92.2	85.0	111
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	92.2	82.0	112
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	92.1	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	93.6	83.0	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	89.0	82.0	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	91.0	82.0	112
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	93.1	85.0	115
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	95.5	83.0	109
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	91.5	81.0	117
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.5 mg/L	90.4	85.0	115
EG035F: Dissolved Mercury by FIMS (QCLot: 3928791)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	99.3	83.0	105
EP067: Glycols (QCLot: 3929025)								
EP067: 2-Ethoxyethyl acetate	111-15-9	2	mg/L	<2	100 mg/L	79.5	60.3	134
EP067: 2-Butoxyethanol	111-76-2	2	mg/L	<2	100 mg/L	80.7	61.6	140
EP067: Propylene glycol	57-55-6	2	mg/L	<2	100 mg/L	127	77.9	132
EP067: Ethylene glycol	107-21-1	2	mg/L	<2	100 mg/L	135	74.7	136
EP067: Diethylene glycol monobutyl ether	112-34-5	2	mg/L	<2	100 mg/L	107	73.4	136
EP067: Diethylene glycol	111-46-6	2	mg/L	<2	100 mg/L	123	74.4	138
EP067: Triethylene glycol	112-27-6	2	mg/L	<2	100 mg/L	124	69.0	142
EP075(SIM)A: Phenolic Compounds (QCLot: 3920782)								
EP075(SIM): Phenol	108-95-2	1	µg/L	<1.0	5 µg/L	35.8	24.5	61.9
EP075(SIM): 2-Chlorophenol	95-57-8	1	µg/L	<1.0	5 µg/L	75.0	52.0	90.0
EP075(SIM): 2-Methylphenol	95-48-7	1	µg/L	<1.0	5 µg/L	69.0	51.0	91.0
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	2	µg/L	<2.0	10 µg/L	61.8	44.0	88.0
EP075(SIM): 2-Nitrophenol	88-75-5	1	µg/L	<1.0	5 µg/L	68.8	48.0	100
EP075(SIM): 2,4-Dimethylphenol	105-67-9	1	µg/L	<1.0	5 µg/L	75.3	49.0	99.0
EP075(SIM): 2,4-Dichlorophenol	120-83-2	1	µg/L	<1.0	5 µg/L	76.0	53.0	105
EP075(SIM): 2,6-Dichlorophenol	87-65-0	1	µg/L	<1.0	5 µg/L	73.7	57.0	105



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP075(SIM)A: Phenolic Compounds (QCLot: 3920782) - continued								
EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	1	µg/L	<1.0	5 µg/L	68.0	53.0	99.0
EP075(SIM): 2,4,6-Trichlorophenol	88-06-2	1	µg/L	<1.0	5 µg/L	69.5	50.0	106
EP075(SIM): 2,4,5-Trichlorophenol	95-95-4	1	µg/L	<1.0	5 µg/L	77.5	51.0	105
EP075(SIM): Pentachlorophenol	87-86-5	2	µg/L	<2.0	10 µg/L	35.9	10.0	95.0
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3920782)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	72.5	50.0	94.0
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	75.8	63.6	114
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	79.7	62.2	113
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	78.4	63.9	115
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	93.3	62.6	116
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	89.3	64.3	116
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	95.2	63.6	118
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	90.7	63.1	118
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	94.7	64.1	117
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	86.2	62.5	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	1	µg/L	<1.0	5 µg/L	83.6	61.7	119
	205-82-3							
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	91.9	63.0	115
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	89.7	63.3	117
EP075(SIM): Indeno(1,2,3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	89.4	59.9	118
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	90.3	61.2	117
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	90.9	59.1	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3920783)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	75.4	55.8	112
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	97.5	71.6	113
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	104	56.0	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3926733)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	85.4	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3920783)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	82.6	57.9	119
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	103	62.5	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	74.1	61.5	121
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3926733)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	86.7	75.0	127
EP080: BTEXN (QCLot: 3926733)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	111	70.0	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	92.0	69.0	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	91.6	70.0	120

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	Low	High
EP080: BTEXN (QCLot: 3926733) - continued								
EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	10 µg/L	86.9	69.0	121
	106-42-3							
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	88.0	72.0	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	91.0	70.0	120

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 3928790)							
ES2134799-002	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	105	70.0	130
		EG020A-F: Beryllium	7440-41-7	1 mg/L	78.1	70.0	130
		EG020A-F: Barium	7440-39-3	1 mg/L	87.1	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	76.6	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	93.1	70.0	130
		EG020A-F: Cobalt	7440-48-4	1 mg/L	108	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	108	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	73.5	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	113	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	111	70.0	130
		EG020A-F: Vanadium	7440-62-2	1 mg/L	107	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	70.8	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 3928791)							
ES2134300-001	EMB13	EG035F: Mercury	7439-97-6	0.01 mg/L	92.3	70.0	130
EP067: Glycols (QCLot: 3929025)							
ES2134289-007	Anonymous	EP067: 2-Ethoxyethyl acetate	111-15-9	100 mg/L	129	37.5	146
		EP067: 2-Butoxyethanol	111-76-2	100 mg/L	127	43.6	151
		EP067: Propylene glycol	57-55-6	100 mg/L	130	69.4	137
		EP067: Ethylene glycol	107-21-1	100 mg/L	137	59.9	140
		EP067: Diethylene glycol monobutyl ether	112-34-5	100 mg/L	129	56.8	147
		EP067: Diethylene glycol	111-46-6	100 mg/L	124	46.9	150
		EP067: Triethylene glycol	112-27-6	100 mg/L	123	32.2	156
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3926733)							
ES2134300-003	QC01A	EP080: C6 - C9 Fraction	----	325 µg/L	81.4	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3926733)							



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3926733) - continued							
ES2134300-003	QC01A	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	80.4	70.0	130
EP080: BTEXN (QCLot: 3926733)							
ES2134300-003	QC01A	EP080: Benzene	71-43-2	25 µg/L	98.5	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	86.1	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	88.7	70.0	130
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	84.9	70.0	130
			106-42-3				
		EP080: ortho-Xylene	95-47-6	25 µg/L	86.9	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	88.4	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES2134300	Page	: 1 of 5
Client	: GREENCAP-NAA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: VARUN BHAGWAT	Telephone	: +61 2 8784 8555
Project	: J174436 Groundwater Monitoring	Date Samples Received	: 24-Sep-2021
Site	: 800 Berrimah Rd, East Arm	Issue Date	: 05-Oct-2021
Sampler	: VARUN BHAGWAT	No. of samples received	: 3
Order number	: PO292545	No. of samples analysed	: 3

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- **NO** Matrix Spike outliers occur.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.



Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
PAH/Phenols (GC/MS - SIM)	0	4	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	14	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
PAH/Phenols (GC/MS - SIM)	0	4	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	14	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020A-F) EMB13, EMB14	23-Sep-2021	----	----	----	29-Sep-2021	22-Mar-2022	✓
EG035F: Dissolved Mercury by FIMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG035F) EMB13, EMB14	23-Sep-2021	----	----	----	30-Sep-2021	21-Oct-2021	✓
EP067: Glycols							
VOC Vial - unpreserved (EP067) EMB13, EMB14	23-Sep-2021	29-Sep-2021	30-Sep-2021	✓	29-Sep-2021	30-Sep-2021	✓
EP075(SIM)A: Phenolic Compounds							
Amber Glass Bottle - Unpreserved (EP075(SIM)) QC01A	23-Sep-2021	27-Sep-2021	30-Sep-2021	✓	27-Sep-2021	06-Nov-2021	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM)) QC01A	23-Sep-2021	27-Sep-2021	30-Sep-2021	✓	27-Sep-2021	06-Nov-2021	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071) QC01A	23-Sep-2021	27-Sep-2021	30-Sep-2021	✓	27-Sep-2021	06-Nov-2021	✓
Clear glass VOC vial - HCl (EP080) QC01A	23-Sep-2021	29-Sep-2021	07-Oct-2021	✓	29-Sep-2021	07-Oct-2021	✓

Page : 3 of 5
 Work Order : ES2134300
 Client : GREENCAP-NAA PTY LTD
 Project : J174436 Groundwater Monitoring



Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071) QC01A	23-Sep-2021	27-Sep-2021	30-Sep-2021	✓	27-Sep-2021	06-Nov-2021	✓
Clear glass VOC vial - HCl (EP080) QC01A	23-Sep-2021	29-Sep-2021	07-Oct-2021	✓	29-Sep-2021	07-Oct-2021	✓
EP080: BTEXN							
Clear glass VOC vial - HCl (EP080) QC01A	23-Sep-2021	29-Sep-2021	07-Oct-2021	✓	29-Sep-2021	07-Oct-2021	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Dissolved Mercury by FIMS	EG035F	1	6	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Glycols by GCMS	EP067	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	4	0.00	10.00	✗	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	14	0.00	10.00	✗	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Dissolved Mercury by FIMS	EG035F	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Glycols by GCMS	EP067	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Dissolved Mercury by FIMS	EG035F	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Glycols by GCMS	EP067	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Dissolved Mercury by FIMS	EG035F	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Glycols by GCMS	EP067	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	4	0.00	5.00	✗	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	14	0.00	5.00	✗	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
Glycols by GCMS	EP067	WATER	In house method for the analysis of Glycols in water by GCMS
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015 The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270 Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260 Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM Schedule B(3)
Preparation Methods	Method	Matrix	Method Descriptions
Sample Preparation for Glycols in water analysis	EP067-PR	WATER	In house. Samples are pre-filtered and diluted 1:1 with methanol. Internal standards are added prior to analysis.
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for purging.

CERTIFICATE OF ANALYSIS

Work Order : **ES2134300**
Client : **GREENCAP-NAA PTY LTD**
Contact : VARUN BHAGWAT
Address : 11/14 Winnellie Road
 WINNELLIE NT, AUSTRALIA 0820
Telephone : ----
Project : J174436 Groundwater Monitoring
Order number : PO292545
C-O-C number : ----
Sampler : VARUN BHAGWAT
Site : 800 Berrimah Rd, East Arm
Quote number : EN/222
No. of samples received : 3
No. of samples analysed : 3

Page : 1 of 6
Laboratory : Environmental Division Sydney
Contact : Shane Ellis
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61 2 8784 8555
Date Samples Received : 24-Sep-2021 06:30
Date Analysis Commenced : 27-Sep-2021
Issue Date : 05-Oct-2021 12:18



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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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>
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC



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.

- EP075 (SIM): Where reported, Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- No standard reference exists for the Holding Time of Glycols in waters. ALS takes a conservative approach and applies a holding time of 7 days for analysis.



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				EMB13	EMB14	QC01A	----	----
Sampling date / time				23-Sep-2021 00:00	23-Sep-2021 00:00	23-Sep-2021 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2134300-001	ES2134300-002	ES2134300-003	-----	-----
				Result	Result	Result	----	----
EG020F: Dissolved Metals by ICP-MS								
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	----	----	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	----	----	----
Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	----	----	----
Barium	7440-39-3	0.001	mg/L	0.051	0.213	----	----	----
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	----	----	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	----	----	----
Copper	7440-50-8	0.001	mg/L	0.003	<0.001	----	----	----
Manganese	7439-96-5	0.001	mg/L	0.035	0.012	----	----	----
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	----	----	----
Lead	7439-92-1	0.001	mg/L	0.002	<0.001	----	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	----	----	----
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	----	----	----
Zinc	7440-66-6	0.005	mg/L	0.030	0.109	----	----	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	----	----	----
EP067: Glycols								
2-Ethoxyethyl acetate	111-15-9	2	mg/L	<2	<2	----	----	----
2-Butoxyethanol	111-76-2	2	mg/L	<2	<2	----	----	----
Propylene glycol	57-55-6	2	mg/L	<2	<2	----	----	----
Ethylene glycol	107-21-1	2	mg/L	<2	<2	----	----	----
Diethylene glycol monobutyl ether	112-34-5	2	mg/L	<2	<2	----	----	----
Diethylene glycol	111-46-6	2	mg/L	<2	<2	----	----	----
Triethylene glycol	112-27-6	2	mg/L	<2	<2	----	----	----
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	1.0	µg/L	----	----	<1.0	----	----
2-Chlorophenol	95-57-8	1.0	µg/L	----	----	<1.0	----	----
2-Methylphenol	95-48-7	1.0	µg/L	----	----	<1.0	----	----
3- & 4-Methylphenol	1319-77-3	2.0	µg/L	----	----	<2.0	----	----
2-Nitrophenol	88-75-5	1.0	µg/L	----	----	<1.0	----	----
2,4-Dimethylphenol	105-67-9	1.0	µg/L	----	----	<1.0	----	----
2,4-Dichlorophenol	120-83-2	1.0	µg/L	----	----	<1.0	----	----



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				EMB13	EMB14	QC01A	----	----
Sampling date / time				23-Sep-2021 00:00	23-Sep-2021 00:00	23-Sep-2021 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2134300-001	ES2134300-002	ES2134300-003	-----	-----
				Result	Result	Result	----	----
EP075(SIM)A: Phenolic Compounds - Continued								
2,6-Dichlorophenol	87-65-0	1.0	µg/L	----	----	<1.0	----	----
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L	----	----	<1.0	----	----
2,4,6-Trichlorophenol	88-06-2	1.0	µg/L	----	----	<1.0	----	----
2,4,5-Trichlorophenol	95-95-4	1.0	µg/L	----	----	<1.0	----	----
Pentachlorophenol	87-86-5	2.0	µg/L	----	----	<2.0	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1.0	µg/L	----	----	<1.0	----	----
Acenaphthylene	208-96-8	1.0	µg/L	----	----	<1.0	----	----
Acenaphthene	83-32-9	1.0	µg/L	----	----	<1.0	----	----
Fluorene	86-73-7	1.0	µg/L	----	----	<1.0	----	----
Phenanthrene	85-01-8	1.0	µg/L	----	----	<1.0	----	----
Anthracene	120-12-7	1.0	µg/L	----	----	<1.0	----	----
Fluoranthene	206-44-0	1.0	µg/L	----	----	<1.0	----	----
Pyrene	129-00-0	1.0	µg/L	----	----	<1.0	----	----
Benzo(a)anthracene	56-55-3	1.0	µg/L	----	----	<1.0	----	----
Chrysene	218-01-9	1.0	µg/L	----	----	<1.0	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L	----	----	<1.0	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	----	----	<1.0	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L	----	----	<0.5	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	----	----	<1.0	----	----
Dibenz(a,h)anthracene	53-70-3	1.0	µg/L	----	----	<1.0	----	----
Benzo(g,h,i)perylene	191-24-2	1.0	µg/L	----	----	<1.0	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	----	----	<0.5	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	----	----	<0.5	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	----	----	<20	----	----
C10 - C14 Fraction	----	50	µg/L	----	----	<50	----	----
C15 - C28 Fraction	----	100	µg/L	----	----	<100	----	----
C29 - C36 Fraction	----	50	µg/L	----	----	<50	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	----	----	<50	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	----	----	<20	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	----	----	<20	----	----



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				EMB13	EMB14	QC01A	----	----
Sampling date / time				23-Sep-2021 00:00	23-Sep-2021 00:00	23-Sep-2021 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2134300-001	ES2134300-002	ES2134300-003	-----	-----
				Result	Result	Result	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued								
>C10 - C16 Fraction	----	100	µg/L	----	----	<100	----	----
>C16 - C34 Fraction	----	100	µg/L	----	----	<100	----	----
>C34 - C40 Fraction	----	100	µg/L	----	----	<100	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	----	----	<100	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	----	----	<100	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	----	----	<1	----	----
Toluene	108-88-3	2	µg/L	----	----	<2	----	----
Ethylbenzene	100-41-4	2	µg/L	----	----	<2	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	----	----	<2	----	----
ortho-Xylene	95-47-6	2	µg/L	----	----	<2	----	----
^ Total Xylenes	----	2	µg/L	----	----	<2	----	----
^ Sum of BTEX	----	1	µg/L	----	----	<1	----	----
Naphthalene	91-20-3	5	µg/L	----	----	<5	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	1.0	%	----	----	18.5	----	----
2-Chlorophenol-D4	93951-73-6	1.0	%	----	----	52.4	----	----
2,4,6-Tribromophenol	118-79-6	1.0	%	----	----	48.4	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	1.0	%	----	----	73.4	----	----
Anthracene-d10	1719-06-8	1.0	%	----	----	98.1	----	----
4-Terphenyl-d14	1718-51-0	1.0	%	----	----	93.2	----	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	----	----	123	----	----
Toluene-D8	2037-26-5	2	%	----	----	112	----	----
4-Bromofluorobenzene	460-00-4	2	%	----	----	96.5	----	----



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	44
2-Chlorophenol-D4	93951-73-6	14	94
2,4,6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

Inter-Laboratory Testing

Analysis conducted by ALS Melbourne, NATA accreditation no. 825, site no. 13778 (Chemistry).

(WATER) EP067: Glycols



25 October 2021

11/14 Winnellie Central
Winnellie, NT 0820
P: (08) 7906 1300
www.greencap.com.au

George Hatzimihalis
Technical Director
Global Resource Recovery
Vopak Terminal, East Arm
Northern Territory 0822

RE: GLOBAL RESOURCE RECOVERY – MONTHLY GROUNDWATER MONITORING EVENT (OCTOBER 2021)

1.0 Introduction

Greencap Pty Ltd (Greencap) was commissioned by Global Resource Recovery (GRR) to implement a groundwater monitoring program, inclusive of monthly, quarterly and annual monitoring events at the Vopak Terminal located at East Arm, Northern Territory (the Site).

Greencap has previously undertaken monthly groundwater monitoring at the Site in accordance with Attachment B of the Environment Protection Licence (EPL) 229-01.

This report details the results of the October monthly monitoring event.

2.0 Groundwater Monthly Monitoring Event – October 2021

The monthly monitoring event included:

- gauging of water levels in all five monitoring bores.
- measurement of field parameters in two monitoring bores.

2.1 Methodology

Greencap conducted a monitoring event on 20 October 2021 involving the gauging of five monitoring bores (EMB7, EMB12, EMB13, EMB14 and EMB15) and the measurement of field parameters in two monitoring bores (EMB13 and EMB14).

The following methodology was applied:

- Measuring standing water levels (SWL) from the surveyed point at the top of the casings using water/product interface water level meter prior to sampling.
- Monitoring physio-chemical parameters (pH, temperature, dissolved oxygen, electrical conductivity, salinity, total dissolved solids, turbidity and oxidation-reduction potential) during purging using a calibrated water quality meter. A low flow peristaltic pump with monitoring bore-specific dedicated tubing was used to draw groundwater from the monitoring bores. Field parameters were recorded once they were deemed to have stabilised. Field observations were recorded during sampling including aesthetic evidence of contamination such as sheen, colour and odour.

2.2 Results

The recorded SWLs and measured field parameters are presented in Table 1 and Table 2 respectively.

Table 1 – October 2021 Groundwater Levels

Well ID	Date	SWL			Depth of Bore (m)
		mBTOC	mBGL	mAHD	
EMB7	20/10/2021	3.602	3.602	2.823	9.237
EMB12	20/10/2021	3.154	3.154	3.346	9.325
EMB13	20/10/2021	5.268	4.468	3.568	10.245
EMB14	20/10/2021	5.587	4.887	3.668	9.803
EMB15	20/10/2021	2.546	2.546	4.108	9.314

mBTOC – metres below top of casing

mBGL – metres below ground level

mAHD – metres Australian Height Datum

Table 2 – October 2021 Field Parameters

Well ID	pH	Temperature (°C)	Dissolved Oxygen (% saturation)	Electrical Conductivity (µS/cm)	Salinity (PSU)	Total Dissolved Solids (mg/L)	Turbidity (NTU)	ORP (mV)
EMB13	3.82	33.1	23	281.7	0.13	182.65	4.77	137.8
EMB14	5.63	34.2	39.5	400.1	0.19	249.6	5.43	369.2

Field records are presented in Attachment 2.

The next groundwater monitoring event is scheduled to occur in November 2021.

Attachments

- 1 Statements of Limitation
- 2 Field Record Sheets

Yours Sincerely,



Varun Bhagwat
 Environmental Consultant - NT
 T: 0428 829 444
 E: Varun.Bhagwat@greencap.com.au



Groundwater Monitoring Event – October 2021

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 1: Statements of Limitation

Statements of Limitation

All and any Services proposed by Greencap to the Client were subject to the Terms and Conditions listed on the Greencap website at: <https://www.greencap.com.au/terms-conditions> Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap does not agree to any alternative terms or variation of these terms if subsequently proposed by the Client. The Services were carried out in accordance with the current and relevant industry standards of testing, interpretation and analysis. The Services were carried out in accordance with Commonwealth, State, Territory or Government legislation, regulations and/or guidelines. The Client was deemed to have accepted these Terms when the Client signed the Proposal (where indicated) or when the Company commenced the Services at the request (written or otherwise) of the Client.

The services were carried out for the Specific Purpose, outlined in the body of the Proposal. To the fullest extent permitted by law, Greencap, its related bodies corporate, its officers, consultants, employees and agents assume no liability, and will not be liable to any person, or in relation to, any losses, damages, costs or expenses, and whether arising in contract, tort including negligence, under statute, in equity or otherwise, arising out of, or in connection with, any matter outside the Specific Purpose.

The Client acknowledged and agreed that proposed investigations were to rely on information provided to Greencap by the Client or other third parties. Greencap made no representation or warranty regarding the completeness or accuracy of any descriptions or conclusions based on information supplied to it by the Client, its employees or other third parties during provision of the Services. Under no circumstances shall Greencap have any liability for, or in relation to, any work, reports, information, plans, designs, or specifications supplied or prepared by any third party, including any third party recommended by Greencap. The Client releases and indemnifies Greencap from and against all Claims arising from errors, omissions or inaccuracies in documents or other information provided to Greencap by the Client, its employees or other third parties.

The Client was to ensure that Greencap had access to all information, sites and buildings as required by or necessary for Greencap to undertake the Services. Notwithstanding any other provision in these Terms, Greencap will have no liability to the Client or any third party to the extent that the performance of the Services was not able to be undertaken (in whole or in part) due to access to any relevant sites or buildings being prevented or delayed due to the Client or their respective employees or contractors expressing safety or health concerns associated with such access.

Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap, its related bodies corporate, its officers, employees and agents assume no liability and will not be liable for lost profit, revenue, production, contract, opportunity, loss arising from business interruption or delay, indirect or consequential loss or loss to the extent caused or contributed to by the Client or third parties, suffered or incurred arising out of or in connection with our Proposals, Reports, the Project or the Agreement. In the event Greencap is found by a Court or Tribunal to be liable to the Client for any loss or damage arising in connection with the Services, the Client's entitlement to recover damages from Greencap shall be reduced by such amount as reflects the extent to which any act, default, omission or negligence of the Client, or any third party, caused or contributed to such loss or damage. Unless otherwise agreed in writing and signed by both parties, Greencap's total aggregate liability will not exceed the total consulting fees paid by the client in relation to this Proposal. For further detail, see Greencap's Terms and Conditions available at <https://www.greencap.com.au/terms-conditions>

The Report is provided for the exclusive use of the Client and for this Project only, in accordance with the Scope and Specific Purpose as outlined in the Agreement, and only those third parties who have been authorized in writing by Greencap. It should not be used for other purposes, other projects or by a third party unless otherwise agreed and authorized in writing by Greencap. Any person relying upon this Report beyond its exclusive use and Specific Purpose, and without the express written consent of Greencap, does so entirely at their own risk and without recourse to Greencap for any loss, liability or damage. To the extent permitted by law, Greencap assumes no responsibility for any loss, liability, damage, costs or expenses arising from interpretations or conclusions made by others, or use of the Report by a third party. Except as specifically agreed by Greencap in writing, it does not authorize the use of this Report by any third party. It is the responsibility of third parties to independently make inquiries or seek advice in relation to their particular requirements and proposed use of the site.

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Groundwater Monitoring Event – October 2021

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 2: Field Record Sheets

Greencap
Groundwater Level Gauging Form



Client: GRR		Job No: J174436
Project: Groundwater Monitoring		Gauged by: VB
Location: 780-800 Berrimah Rd, East Arm		Date: 20/10/21

Water Level Dipper Type (interphase, length etc):

IP

Time	Well Name	Depth to Product (m)	Depth to water (m)	Product Thickness (mm)	Depth of Well (m)	Comments
14150	EMB7	—	3.602	—	9.237	
1456	EMB12		3.154	—	9.325	
1310	EMB13	—	5.268	—	10.245	
1402	EMB14	—	5.587	—	9.803	
1500	EMB15		2.646		9.314	

Observations / Comments:

Weather Conditions (e.g. cloudy, sunny, windy etc), Pumping, etc

HOT, HUMID, SUNNY & LIGHT WIND

Groundwater Sampling Record

Client: <u>GRR</u>		Job No: <u>J174436</u>		Well ID <u>EMB13</u>
Project: <u>Groundwater Monitoring</u>		Sampled by: <u>VB</u>		
Location: <u>800 Berrimah Rd, East Arm</u>		Date: <u>20/10/21</u>		
WELL DETAILS		SAMPLING EQUIPMENT		
Well depth: <u>10.245</u> (m)	Device: <u>micropurge</u> <u>peristaltic</u> footvalve bailer	*Other Sampling Equipment / Method		
Casing diameter: <u>50</u> (mm)	Method: <u>low-flow</u> 4-well-volume purged dry			
Casing type: <u>PVC</u> / steel / other	WQM Make: <u>NSI</u>			
Depth to product (m bTOC)	WL Meter: <u>interface</u> non-interface			
Depth to water: <u>5.268</u> (m bTOC)	Screen (from - to), m <u>7.245 - 10.245</u>			
Product thickness (m)	Pump Depth (m bTOC)			

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
Hot / humid / sunny / slight wind

Purging instructions:

Low Flow: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume: The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume 50mm (2") diameter - 2 L/metre; 100mm (4") diameter - 8 L/metre; 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment		
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond (µS/cm) / mS/cm	ORP mV	DO mg/L / ppm / %	Turbidity, Colour, Odour, Sheen, etc		
1324	1NT	5.678	32.7	5.11	266.1	213.4	26.0	SAL 0.12	TDS 172.9	Turb NTU
1327	2	6.144	32.6	2.31	273.2	249.1	20.7	0.12	177.45	
1330	4	6.269	32.6	6.58	276.9	269.7	19.0	0.13	180.70	
1333	6	6.506	32.6	1.44	281.3	288.0	17.0	0.13	182.65	
1336	8	6.741	32.6	1.26	283.1	297.0	13.7	0.13	184.60	
1339	10	6.964	32.6	1.02	284.0	309.4	15.4	0.13	184.60	
1342	12	7.171	32.6	5.27	284.0	53.6	25.8	0.13	184.60	
1342	13.5	7.329	33.0	3.84	282.7	138.5	24.2	0.13	183.95	
1350	15.0	7.331	33.1	3.82	281.7	137.8	23.0	0.13	182.65	5.81

Observations during Sampling: eg. odours, sheens, turbidity, water colour, etc
Low turbidity, clear, no sheen/odours.

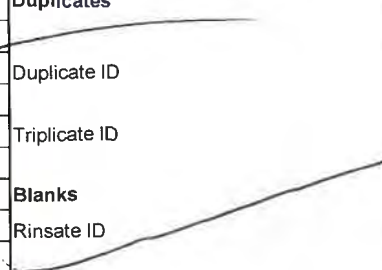
Slow RECHARGE

SAMPLED AFTER

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments
Glass amber (100-250ml)		none	Duplicate ID	
Glass vial (40mL)		HCl	Triplicate ID	
Plastic (60mL) - metals*		HNO3	Blanks	
Plastic (60mL) - cyanide, CrVI*		NaOH	Rinsate ID	
Plastic (60mL) - nutrients		H2SO4		
Plastic (500mL) - inorganics		none		
Plastic ()				
Plastic ()				

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

Client: <u>GRR</u>		Job No: <u>J174436</u>		Well ID <u>EMB14</u>					
Project: <u>Groundwater Monitoring</u>		Sampled by: <u>VB</u>							
Location: <u>800 Berrimah Rd, East Arm</u>		Date: <u>20/10/21</u>							
WELL DETAILS			SAMPLING EQUIPMENT						
Well depth: <u>10.245</u> <u>9.803</u> (m)			Device: <u>micropurge</u> <u>peristaltic</u> <u>footvalve</u> <u>bailer</u>		*Other Sampling Equipment / Method				
Casing diameter: <u>50</u> (mm)			Method: <u>low-flow</u> <u>4-well-volume</u> <u>purged dry</u>						
Casing type: <u>PVC</u> / steel / other			WQM Make: <u>YSI</u>						
Depth to product <u>—</u> (m bTOC)			WL Meter: <u>interface</u> <u>non-interface</u>						
Depth to water: <u>5.587</u> (m bTOC)			Screen (from - to), m <u>6.314 - 9.314</u>						
Product thickness <u>—</u> (m)			Pump Depth (m bTOC)						
Field observations: eg. well condition, nearby activities, weather, vegetation, etc <u>Hot / humid / sunny / light wind</u>									
Purging instructions: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.									
4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart. <u>Well volume 50mm (2") diameter - 2 L/metre, 100mm (4") diameter - 8 L/metre, 150mm (6") diameter - 18 L/metre</u>									
Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment	
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond µS/cm / mS/cm	ORP mV	DO mg/L / ppm / %	Turbidity Colour Odour, Sheen, etc <u>SAL TDS</u>	
1404	INT	6.009	34.3	5.61	407.0	450.8	19.3	0.19	264.55
1407	2	6.689	34.3	5.72	413.2	483.7	13.0	0.19	269.10
1410	4	7.167	34.4	5.68	417.2	493.6	12.2	0.19	268.20
1414	6	7.161	34.3	5.64	373.1	477.4	18.8	0.17	240.50
1418	8	7.161	34.3	5.62	285.6	330.8	37.8	0.14	189.80
1421	10	7.161	34.3	5.63	286.1	307.8	37.1	0.14	199.35
1424	12	7.161	34.2	5.63	400.1	369.2	39.5	0.19	249.60
Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc <u>L-m TURBIDITY, clear, no sheen/odours</u> <u>Quick REACTION AFTER ~1.5m head dropped.</u>									
Container Volume (L)		No of containers	Preservative	Duplicates				Other Comments	
Glass amber (100-250ml)			none						
Glass vial (40mL)			HCl						
Plastic (60mL) - metals*			HNO3						
Plastic (60mL) - cyanide, CrVI*			NaOH	Triplicate ID					
Plastic (60mL) - nutrients			H2SO4	Blanks Rinsate ID					
Plastic (500mL) - inorganics			none						
Plastic ()									
Plastic ()									
Plastic ()									
Plastic ()									
Plastic ()									
Plastic ()									

*samples for dissolved metals to be filtered in the field prior to filling sampling container



5 December 2021

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Winnellie, NT 0820
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www.greencap.com.au

George Hatzimihalis
Technical Director
Global Resource Recovery
Vopak Terminal, East Arm
Northern Territory 0822

RE: GLOBAL RESOURCE RECOVERY – MONTHLY GROUNDWATER MONITORING EVENT (NOVEMBER 2021)

1.0 Introduction

Greencap Pty Ltd (Greencap) was commissioned by Global Resource Recovery (GRR) to implement a groundwater monitoring program, inclusive of monthly, quarterly and annual monitoring events at the Vopak Terminal located at East Arm, Northern Territory (the Site).

Greencap has previously undertaken monthly groundwater monitoring at the Site in accordance with Attachment B of the Environment Protection Licence (EPL) 229-01.

This report details the results of the November monthly monitoring event.

2.0 Groundwater Monthly Monitoring Event – November 2021

The monthly monitoring event included:

- gauging of water levels in all five monitoring bores.
- measurement of field parameters in two monitoring bores.

2.1 Methodology

Greencap conducted a monitoring event on 30 November 2021 involving the gauging of five monitoring bores (EMB7, EMB12, EMB13, EMB14 and EMB15) and the measurement of field parameters in two monitoring bores (EMB13 and EMB14).

The following methodology was applied:

- Measuring standing water levels (SWL) from the surveyed point at the top of the casings using water/product interface water level meter prior to sampling.
- Monitoring physio-chemical parameters (pH, temperature, dissolved oxygen, electrical conductivity, salinity, total dissolved solids, turbidity and oxidation-reduction potential) during purging using a calibrated water quality meter. A low flow peristaltic pump with monitoring bore-specific dedicated tubing was used to draw groundwater from the monitoring bores. Field parameters were recorded once they were deemed to have stabilised. Field observations were recorded during sampling including aesthetic evidence of contamination such as sheen, colour and odour.

2.2 Results

The recorded SWLs and measured field parameters are presented in Table 1 and Table 2 respectively.

Table 1 – November 2021 Groundwater Levels

Well ID	Date	SWL			Depth of Bore (m)
		mBTOC	mBGL	mAHD	
EMB7	30/11/2021	2.522	2.522	3.903	9.237
EMB12	30/11/2021	2.291	2.291	4.209	9.325
EMB13	30/11/2021	4.173	3.373	4.663	10.245
EMB14	30/11/2021	4.546	3.846	4.709	9.803
EMB15	30/11/2021	1.876	1.876	4.778	9.314

mBTOC – metres below top of casing

mBGL – metres below ground level

mAHD – metres Australian Height Datum

Table 2 – November 2021 Field Parameters

Well ID	pH	Temperature (°C)	Dissolved Oxygen (% saturation)	Electrical Conductivity (µS/cm)	Salinity (PSU)	Total Dissolved Solids (mg/L)	Turbidity (NTU)	ORP (mV)
EMB13	3.64	33.0	44.2	275.8	0.13	182.65	4.68	126.9
EMB14	5.93	35.0	55.0	343.3	0.16	221.00	5.93	54.6

Field records are presented in Attachment 2.

The next groundwater monitoring event is scheduled to occur in December 2021.

Attachments

- 1 Statements of Limitation
- 2 Field Record Sheets

Yours Sincerely,



Varun Bhagwat
 Environmental Consultant - NT
 T: 0428 829 444
 E: Varun.Bhagwat@greencap.com.au



Groundwater Monitoring Event – November 2021

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 1: Statements of Limitation

Statements of Limitation

All and any Services proposed by Greencap to the Client were subject to the Terms and Conditions listed on the Greencap website at: <https://www.greencap.com.au/terms-conditions> Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap does not agree to any alternative terms or variation of these terms if subsequently proposed by the Client. The Services were carried out in accordance with the current and relevant industry standards of testing, interpretation and analysis. The Services were carried out in accordance with Commonwealth, State, Territory or Government legislation, regulations and/or guidelines. The Client was deemed to have accepted these Terms when the Client signed the Proposal (where indicated) or when the Company commenced the Services at the request (written or otherwise) of the Client.

The services were carried out for the Specific Purpose, outlined in the body of the Proposal. To the fullest extent permitted by law, Greencap, its related bodies corporate, its officers, consultants, employees and agents assume no liability, and will not be liable to any person, or in relation to, any losses, damages, costs or expenses, and whether arising in contract, tort including negligence, under statute, in equity or otherwise, arising out of, or in connection with, any matter outside the Specific Purpose.

The Client acknowledged and agreed that proposed investigations were to rely on information provided to Greencap by the Client or other third parties. Greencap made no representation or warranty regarding the completeness or accuracy of any descriptions or conclusions based on information supplied to it by the Client, its employees or other third parties during provision of the Services. Under no circumstances shall Greencap have any liability for, or in relation to, any work, reports, information, plans, designs, or specifications supplied or prepared by any third party, including any third party recommended by Greencap. The Client releases and indemnifies Greencap from and against all Claims arising from errors, omissions or inaccuracies in documents or other information provided to Greencap by the Client, its employees or other third parties.

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Groundwater Monitoring Event – November 2021

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 2: Field Record Sheets

Client: GRR		Job No: J174436
Project: GME		Gauged by: VB
Location: 780-800 Berrimah Rd, East Arm NT		Date: 30/11/2021

Water Level Dipper Type (interphase, length etc): 1P

[illegible]**Observations / Comments:**

Weather Conditions (e.g. cloudy, sunny, windy etc), Pumping, etc

SUNNY, HOT, HUMID, SLIGHT WIND.

Groundwater Sampling Record

Client: <u>GRR</u>		Job No: <u>J174436</u>		Well ID EMB13						
Project: <u>GME</u>		Sampled by: <u>VB</u>								
Location: <u>800 Berrimah Rd, East Arm</u>		Date: <u>30-Nov-21</u>								
WELL DETAILS			SAMPLING EQUIPMENT							
Well depth: <u>10.245</u> (m)		Device: <u>micropurge</u> <u>peristaltic</u> footvalve bailer		*Other Sampling Equipment / Method						
Casing diameter: <u>50</u> (mm)		Method: <u>low-flow</u> 4-well-volume purged dry								
Casing type: <u>PVC</u> steel / other		WQM Make: <u>YSI</u>								
Depth to product (m bTOC)		WL Meter: <u>interface</u> non-interface								
Depth to water: <u>4.173</u> (m bTOC)		Screen (from - to), m <u>7.245 - 10.245</u>								
Product thickness (m)		Pump Depth (m bTOC)								
Field observations: eg. well condition, nearby activities, weather, vegetation, etc <u>SUNNY, SLIGHT WIND</u>										
Purging instructions: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.										
Low Flow: The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart. Well volume 50mm (2") diameter - 2 L/metre, 100mm (4") diameter - 8 L/metre, 150mm (6") diameter - 18 L/metre										
Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment		
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond $\mu S/cm$ / mS/cm	ORP mV	DO mg/L / ppm (%)	Turbidity, Colour, Odour, Sheen, etc		
								SAL PSU	TAS mg/L	TUR NTU
1012	1NT	4.182	33.4	8.95	391.8	122.1	26.0	0.15	209.3	
1015	24	4.674	33.3	5.32	279.6	129.1	18.3	0.13	180.7	
1018	4	4.994	33.2	4.03	274.3	124.2	17.5	0.13	178.1	
1021	6	5.494	32.8	3.72	278.9	121.2	21.7	0.13	181.35	
1024	8	5.844	32.9	3.64	278.4	121.0	24.2	0.13	181.35	
1027	10	6.057	32.9	3.63	279.2	119.7	23.7	0.13	181.35	
1030	12	6.217	32.9	3.63	278.4	119.7	24.5	0.13	180.70	
1033	14	6.442	33.0	3.63	281.9	124.1	39.2	0.13	183.30	
1036	16	6.618	33.0	3.64	275.8	126.9	44.2	0.13	182.65	4.68
Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc <u>SLOW RECHARGE</u> <u>L-M TURB, CLEAR, NO SHEEN/ODOUR</u>										
Container Volume (L)		No of containers	Preservative	Duplications				Other Comments		
Glass amber (100-250ml)			none	Duplicate ID Triplicate ID Blanks Rinsate ID						
Glass vial (40mL)			HCl							
Plastic (60mL) - metals*			HNO3							
Plastic (60mL) - cyanide, CrVI*			NaOH							
Plastic (60mL) - nutrients			H2SO4	Duplicate ID Triplicate ID Blanks Rinsate ID						
Plastic (500mL) - inorganics			none							
Plastic ()										
Plastic ()										
				Duplicate ID Triplicate ID Blanks Rinsate ID						

Groundwater Sampling Record

Client: <u>GRR</u>	Job No: <u>J174436</u>	Well ID <u>EMB14</u>
Project: <u>GME</u>	Sampled by: <u>VB</u>	
Location: <u>800 Berrimah Rd, East Arm</u>	Date: <u>30-Nov-21</u>	

WELL DETAILS		SAMPLING EQUIPMENT		*Other Sampling Equipment / Method
Well depth: <u>9.803</u> (m)	Device: <u>micropurge</u> <u>peristaltic</u> footvalve bailer			
Casing diameter: <u>50</u> (mm)	Method: <u>low-flow</u> 4-well-volume purged dry			
Casing type: <u>PVC</u> / steel / other	WQM Make: <u>VSI</u>			
Depth to product: <u>—</u> (m bTOC)	WL Meter: <u>interface</u> non-interface			
Depth to water: <u>4.546</u> (m bTOC)	Screen (from - to), m			
Product thickness: <u>—</u> (m)	Pump Depth (m bTOC) <u>6.803 - 9.803</u>			

Field observations: eg. well condition, nearby activities, weather, vegetation, etc

SUNNY SLIGHT WIND

Purging instructions:

Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume

The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.

Well volume 50mm (2") diameter - 2 L/metre, 100mm (4") diameter - 8 L/metre, 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment		
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond $\mu\text{S/cm}$ / mS/cm	ORP mV	DO mg/L / ppm / %	Turbidity, Colour, Odour, Sheen, etc (NTU) (mg/L) (NTU) SAL TDS Turb		
1051	1 NT	4.874	34.8	5.44	342.4	44.6	13.8	0.15	208.00	
1054	2	5.622	34.9	5.84	289.1	50.8	42.1	0.13	187.85	
1057	4	6.227	35.0	5.97	289.2	54.8	53.5	0.14	189.80	
1100	6	6.656	35.1	6.07	287.2	57.9	59.8	0.13	186.55	
1103	8	7.162	35.3	6.14	290.2	58.8	62.5	0.14	189.15	
1106	10	7.160	35.0	6.65	346.7	44.1	29.7	0.16	222.30	
1109	12	7.160	35.0	5.99	345.8	49.2	40.0	0.16	224.90	
1112	15	7.160	35.0	5.93	343.2	54.6	55.0	0.16	221.00	5.913

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc

L-M TURBIDITY, NO SHEEN/ODOUR, CLEAR
QUICK REACTION AFTER ~ 2.2 m HEAD DROPPED

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments
Glass amber (100-250ml)		none		
Glass vial (40mL)		HCl	Duplicate ID	
Plastic (60mL) - metals*		HNO3		
Plastic (60mL) - cyanide, CrVI*		NaOH	Triplicate ID	
Plastic (60mL) - nutrients		H2SO4		
Plastic (500mL) - inorganics		none	Blanks	
Plastic ()			Rinsate ID	
Plastic ()				

*samples for dissolved metals to be filtered in the field prior to filling sampling container



21 January 2022

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George Hatzimihalis
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Global Resource Recovery
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RE: GLOBAL RESOURCE RECOVERY – QUARTERLY GROUNDWATER MONITORING EVENT (DECEMBER 2021)

1.0 Introduction

1.1 Background

Greencap Pty Ltd (Greencap) was commissioned by Global Resource Recovery (GRR) to implement a groundwater monitoring program, inclusive of monthly, quarterly and annual monitoring events at the Vopak Terminal located at East Arm, Northern Territory (the Site).

Greencap has undertaken a quarterly groundwater monitoring at the Site in accordance with the Northern Territory (NT) Environment Protection Authority (EPA) Environmental Protection Licence (EPL) 229-01 (the Licence) – attached in Appendix A.

This report details the results of the December 2021 quarterly monitoring event.

This document has been prepared with the reference to the (NT EPA): *Guideline for Reporting on Environmental Monitoring, 2016*.

1.2 Monitoring Scope

The groundwater monitoring scope and analytical program are outlined in the Licence (Appendix A), inclusive of quarterly groundwater sampling from EMB13 and EMB14.

The results of groundwater sampling have not been compared to any criteria as there are no specific trigger values listed in the Licence. Results summary tables are included in Attachment 3.

1.3 Previous Monitoring Event

A previous quarterly monitoring event was conducted in September 2021. A comparison of analytical results above laboratory limits of reporting (LoRs) between the two quarterly monitoring events is presented in Table 3.

2.0 Groundwater Quarterly Monitoring Event – December 2021

The quarterly monitoring event included:

- Gauging of water levels in five monitoring bores (EMB7, EMB12, EMB13, EMB14 and EMB15).
- Measurement of field parameters in two monitoring bores (EMB13 and EMB14).
- Laboratory analytical testing of sample collected from EMB13 and EMB14, including:
 - Ø Major cations and anions
 - Ø Nutrients
 - Ø Heavy metals
 - Ø Hydrocarbon compounds

- Ø Cyanide
- Ø Glycols
- Ø Polychlorinated Biphenyls (PCBs)
- Ø Per- and polyfluoroalkyl substances (PFAS)

2.1 Sampling Methodology

All groundwater wells were sampled using an industry standard low flow groundwater sampling techniques with dedicated tubing and in accordance with AS/NZS 5667.1:1998, AS/NZS 5667.11:1998 and <https://www.waterquality.gov.au/anz-guidelines>. The flow rate was monitored and regulated using an interface probe to maintain a stable water level during purging and sampling of groundwater.

The following methodology was applied:

- Measuring standing water levels (SWLs) from the surveyed point at the top of the casings using water/product interface water level meter prior to sampling.
- Monitoring physio-chemical parameters (pH, temperature, dissolved oxygen, electrical conductivity, salinity, total dissolved solids, turbidity and oxidation-reduction potential) during purging using a calibrated water quality meter. Sampling occurred when the drawdown and these parameters had stabilised within the ranges presented in *NT Department of Mines and Energy Methodology for the Sampling of Ground Waters (2009)*.
- The sampler wore a clean pair of disposable nitrile gloves when collecting each sample.
- All groundwater samples collected in appropriate bottles/containers provided by analytical laboratories and placed in a chilled esky for transportation immediately after collection.
- Field observations were recorded during sampling including aesthetic evidence of contamination such as sheen, colour and odour.
- Collection of appropriate quality assurance/quality control (QA/QC) samples including intra- and inter-laboratory duplicates and rinsate and trip blanks.

2.2 Field Observations

Observations noted during the monitoring event were recorded on field record sheets and included groundwater colour, odours, sheens and any other anomalies. The groundwater was generally clear and no odours or sheens were noted from either bore during the monitoring.

The recorded SWLs and measured field parameters are presented in Table 1 and Table 2 respectively.

Table 1 – December 2021 Groundwater Levels

Well ID	Date	SWL			Depth of Bore (m)
		mBTOC	mBGL	mAHD	
EMB7	17/12/21	1.631	1.631	4.794	9.237
EMB12	17/12/21	2.741	2.741	3.759	9.325
EMB13	17/12/21	3.276	2.476	5.560	10.245
EMB14	17/12/21	3.416	2.716	5.839	9.803
EMB15	17/12/21	1.321	1.321	5.333	9.314

mBTOC – metres below top of casing

mBGL – metres below ground level

mAHD – metres Australian Height Datum

Table 2 – December 2021 Field Parameters

Well ID	pH	Temperature (°C)	Dissolved Oxygen (% saturation)	Electrical Conductivity (µS/cm)	Salinity (PSU)	Total Dissolved Solids (mg/L)	Turbidity (NTU)	ORP (mV)
EMB13	7.24	33.4	22.1	272.4	0.13	176.8	4.75	99.4
EMB14	6.39	35.1	33	204.7	0.09	122.6	5.81	68

Field records are presented in Attachment 2.

2.3 Analytical Results

Groundwater samples were analysed at National Association of Testing Authorities (NATA) - accredited laboratories (Eurofins – primary, ALS – secondary). The results are included in Attachment 3 and are summarised below in Table 3. Laboratory certificates of analysis are included in Appendix B.

Table 3 – Analytical Results Summary Above Laboratory Limits of Reporting (LOR)

Parameter	Date	Unit of Measurement	LOR	Range of Analytical Results	
				EMB13	EMB14
Nutrients & Inorganics					
Total Phosphate (as P)	23/09/21	µg/L	10	<10	20
	17/12/21	µg/L		10	20
Total Nitrogen	23/09/21	µg/L	200	6,300	11,200
	17/12/21	µg/L		5,000	15,800
Kjeldahl Nitrogen Total	23/09/21	µg/L	200	500	1,500
	17/12/21	µg/L		<200	800
Oxides of Nitrogen	23/09/21	µg/L	50	5,000	9,700
	17/12/21	µg/L		5,000	15,000
Ammonia (as N)	23/09/21	µg/L	10	90	90
	17/12/21	µg/L		30	<10
Cyanide (total)	23/09/21	µg/L	5	6	<5
	17/12/21	µg/L		110	38
Anions					
Chloride	23/09/21	µg/L	1,000	77,000	67,000
	17/12/21	µg/L		45,000	6,100
Cations					
Calcium	23/09/21	µg/L	500	1000	12,000
	17/12/21	µg/L		1000	28,000
Magnesium	23/09/21	µg/L	500	800	2,300
	17/12/21	µg/L		700	1,700

Parameter	Date	Unit of Measurement	LOR	Range of Analytical Results	
				EMB13	EMB14
Potassium	23/09/21	µg/L	500	1,000	3,600
	17/12/21	µg/L		1,100	3,200
Sodium	23/09/21	µg/L	500	18,000	18,000
	17/12/21	µg/L		18,000	3,800
Heavy Metals (filtered)					
Arsenic	23/09/21	µg/L	1	<1	<1
	17/12/21	µg/L		1	<1
Barium	23/09/21	µg/L	1	51	213
	17/12/21	µg/L		50	363
Boron	23/09/21	µg/L	50	<50	<50
	17/12/21	µg/L		50	<50
Copper	23/09/21	µg/L	1	3	<1
	17/12/21	µg/L		3	4
Lead	23/09/21	µg/L	1	2	<1
	17/12/21	µg/L		<1	<1
Manganese	23/09/21	µg/L	1	35	12
	17/12/21	µg/L		29	3
Nickel	23/09/21	µg/L	1	<1	<1
	17/12/21	µg/L		1	1
Zinc	23/09/21	µg/L	5	30	109
	17/12/21	µg/L		30	799
PFAS					
Sum of PFAS (n=30)	23/09/21	µg/L	0.1	55.49	4.45
	17/12/21	µg/L		14.23	1.1

The results for the December 2021 quarterly monitoring event are summarised as follows:

- Antimony, beryllium, cadmium, chromium, cobalt, lead mercury, selenium and vanadium (all filtered), hydroxide alkalinity as CaCO₃, carbonate alkalinity as CaCO₃, total recoverable hydrocarbons (TRH), polycyclic aromatic hydrocarbons (PAH) and organochlorine pesticides (OCP) were all reported to be below the LoRs for both monitoring bores.
- Several nutrients and organics, chloride, calcium, magnesium, potassium, sodium and filtered heavy metals – arsenic, barium, copper, manganese, nickel and zinc were reported above the LoRs in both monitoring bores, with the exception of total Kjeldahl nitrogen in EMB13 and ammonia, arsenic and boron in EMB14.
- A range of Per- and Polyfluoroalkyl Substances (PFAS) were detected in both monitoring bores.

2.4 QA/QC Results

Groundwater Duplicate Analysis

Field duplicates (QC01 and QC01A, duplicates of EMB13) were collected during the monitoring event and analysed at the intra (Eurofins) and inter (ALS) laboratories for benzene, toluene, ethylbenzene, xylene, naphthalene, TRH, PAH and phenols.

Duplicate analytical results were assessed by calculating relative percent differences between primary sample results and duplicate sample results. All of the inter and intra laboratory duplicate groundwater analyses had RPD values below the recommended comparison criteria of 50%.

A table summarising the duplicate sample results is presented at the end of this report (refer to Attachment 3).

Blank Analyses

Rinsate blank samples (RB01) was collected on 17 December and analysed at the primary laboratory for TRH and BTEXN. The rinsate blank samples were collected from decontaminated sampling equipment to ensure adequate cleaning has occurred.

A trip blank sample (TB01) was prepared and kept with the portable sample cooler for the duration of the and delivered to the primary laboratory for TRH and BTEXN analysis. The trip blanks were prepared using de-ionised water to detect potential cross-contamination throughout the sampling and sample delivery stages of the GME.

A table summarising the rinsate and trip blanks sample results is presented at the end of this report (refer to Attachment 3).

3.0 Conclusions

Greencap conducted a quarterly groundwater monitoring event at the Vopak Terminal at East Arm in accordance with EPL229-01 in December 2021. Physico-chemical groundwater parameters were measured in the field and samples were collected from the two monitoring bores (EM13 and EMB14) and submitted to NATA-accredited laboratories for analytical testing.

Many analytes including filtered metals (antimony, beryllium, cadmium, chromium, cobalt, lead, mercury, selenium and vanadium), hydroxide alkalinity as CaCO_3 , carbonate alkalinity as CaCO_3 , total recoverable hydrocarbons, polycyclic aromatic hydrocarbons and organochlorine pesticides were reported to be below the laboratory limits of reporting in both monitoring bores.

Several nutrients and organics, chloride, calcium, magnesium, potassium, sodium and filtered heavy metals – arsenic, barium, copper, lead, manganese, nickel and zinc were reported above the LoRs in both monitoring bores, with the exception of total Kjeldahl nitrogen in EMB13 and ammonia, arsenic and boron in EMB14.

A range of Per- and Polyfluoroalkyl Substances (PFAS) compounds were detected in both monitoring bores.

The next quarterly groundwater monitoring event is scheduled to occur in March 2022.

Attachments

- 1 Statements of Limitation
- 2 Field Record Sheets
- 3 Results Summary Tables (including QA/QC)

Appendices

- A Environmental Protection Licence 229-01
- B Laboratory Certificates of Analysis

Yours Sincerely,



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Groundwater Monitoring Event – December 2021

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 1: Statements of Limitation

Statements of Limitation

All and any Services proposed by Greencap to the Client were subject to the Terms and Conditions listed on the Greencap website at: <https://www.greencap.com.au/terms-conditions> Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap does not agree to any alternative terms or variation of these terms if subsequently proposed by the Client. The Services were carried out in accordance with the current and relevant industry standards of testing, interpretation and analysis. The Services were carried out in accordance with Commonwealth, State, Territory or Government legislation, regulations and/or guidelines. The Client was deemed to have accepted these Terms when the Client signed the Proposal (where indicated) or when the Company commenced the Services at the request (written or otherwise) of the Client.

The services were carried out for the Specific Purpose, outlined in the body of the Proposal. To the fullest extent permitted by law, Greencap, its related bodies corporate, its officers, consultants, employees and agents assume no liability, and will not be liable to any person, or in relation to, any losses, damages, costs or expenses, and whether arising in contract, tort including negligence, under statute, in equity or otherwise, arising out of, or in connection with, any matter outside the Specific Purpose.

The Client acknowledged and agreed that proposed investigations were to rely on information provided to Greencap by the Client or other third parties. Greencap made no representation or warranty regarding the completeness or accuracy of any descriptions or conclusions based on information supplied to it by the Client, its employees or other third parties during provision of the Services. Under no circumstances shall Greencap have any liability for, or in relation to, any work, reports, information, plans, designs, or specifications supplied or prepared by any third party, including any third party recommended by Greencap. The Client releases and indemnifies Greencap from and against all Claims arising from errors, omissions or inaccuracies in documents or other information provided to Greencap by the Client, its employees or other third parties.

The Client was to ensure that Greencap had access to all information, sites and buildings as required by or necessary for Greencap to undertake the Services. Notwithstanding any other provision in these Terms, Greencap will have no liability to the Client or any third party to the extent that the performance of the Services was not able to be undertaken (in whole or in part) due to access to any relevant sites or buildings being prevented or delayed due to the Client or their respective employees or contractors expressing safety or health concerns associated with such access.

Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap, its related bodies corporate, its officers, employees and agents assume no liability and will not be liable for lost profit, revenue, production, contract, opportunity, loss arising from business interruption or delay, indirect or consequential loss or loss to the extent caused or contributed to by the Client or third parties, suffered or incurred arising out of or in connection with our Proposals, Reports, the Project or the Agreement. In the event Greencap is found by a Court or Tribunal to be liable to the Client for any loss or damage arising in connection with the Services, the Client's entitlement to recover damages from Greencap shall be reduced by such amount as reflects the extent to which any act, default, omission or negligence of the Client, or any third party, caused or contributed to such loss or damage. Unless otherwise agreed in writing and signed by both parties, Greencap's total aggregate liability will not exceed the total consulting fees paid by the client in relation to this Proposal. For further detail, see Greencap's Terms and Conditions available at <https://www.greencap.com.au/terms-conditions>

The Report is provided for the exclusive use of the Client and for this Project only, in accordance with the Scope and Specific Purpose as outlined in the Agreement, and only those third parties who have been authorized in writing by Greencap. It should not be used for other purposes, other projects or by a third party unless otherwise agreed and authorized in writing by Greencap. Any person relying upon this Report beyond its exclusive use and Specific Purpose, and without the express written consent of Greencap, does so entirely at their own risk and without recourse to Greencap for any loss, liability or damage. To the extent permitted by law, Greencap assumes no responsibility for any loss, liability, damage, costs or expenses arising from interpretations or conclusions made by others, or use of the Report by a third party. Except as specifically agreed by Greencap in writing, it does not authorize the use of this Report by any third party. It is the responsibility of third parties to independently make inquiries or seek advice in relation to their particular requirements and proposed use of the site.

The conclusions, or data referred to in this Report, should not be used as part of a specification for a project without review and written agreement by Greencap. This Report has been written as advice and opinion, rather than with the purpose of specifying instructions for design or redevelopment. Greencap does not purport to recommend or induce a decision to make (or not make) any purchase, disposal, investment, divestment, financial commitment or otherwise in relation to the site it investigated.

This Report should be read in whole and should not be copied in part or altered. The Report as a whole set outs the findings of the investigations. No responsibility is accepted by Greencap for use of parts of the Report in the absence (or out of context) of the balance of the Report.



Groundwater Monitoring Event – December 2021

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 2: Field Record Sheets

Client: GRR		Job No: J174436
Project: GME		Gauged by: VB
Location: GRR & Vopak Site, East Arm		Date: 17/12/21

Water Level Dipper Type (interphase, length etc): IP

[illegible]

Observations / Comments:

Weather Conditions (e.g. cloudy, sunny, windy etc), Pumping, etc

SUNNY, SLIGHT WIND

Groundwater Sampling Record

Client: <u>GRR</u>		Job No: <u>J174436</u>		Well ID <u>EMB13</u>						
Project: <u>GME</u>		Sampled by: <u>VB</u>								
Location: <u>GRR & Vopak Site, East Arm</u>		Date: <u>17/12/21</u>								
WELL DETAILS			SAMPLING EQUIPMENT							
Well depth: <u>10.245</u> (m)	Device: <u>micropurge</u> <u>peristaltic</u> <u>footvalve</u> <u>bailer</u>	*Other Sampling Equipment / Method								
Casing diameter: <u>50</u> (mm)	Method: <u>low-flow</u> <u>4-well-volume</u> <u>purged dry</u>									
Casing type: <u>PVC</u> / steel / other	WQM Make: <u>V81</u>									
Depth to product (m bTOC): <u>-</u>	WL Meter: <u>interface</u> <u>non-interface</u>									
Depth to water: <u>3.276</u> (m bTOC)	Screen (from - to), m: <u>7.245 - 10.245</u>									
Product thickness (m): <u>-</u>	Pump Depth (m bTOC): <u>-</u>									
Field observations: eg. well condition, nearby activities, weather, vegetation, etc <u>SUNNY, LIGHT WIND</u>										
Purging instructions: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.										
Low Flow: The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart. Well volume 50mm (2") diameter - 2 L/metre 100mm (4") diameter - 8 L/metre 150mm (6") diameter - 18 L/metre										
Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment Turbidity, Colour, Odour, Sheen, etc <u>TDS</u> <u>SAL</u> <u>TURB</u> <u>mg/L</u> <u>PSI</u> <u>NTU</u>		
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp (°C)	pH Units	Sp. Cond <u>uS/cm</u> / mS/cm	ORP mV	DO mg/L / ppm / %			
1430	1NT	3.513	33.3	8.07	275.1	104.70	31.3	<u>178.21</u> <u>0.13</u> <u>4.75</u>		
1433	2L	4.540	33.3	7.12	275.4	103.91	26.8	<u>177.45</u> <u>0.13</u>		
1436	4L	4.861	33.3	5.39	274.1	102.88	24.1	<u>177.50</u> <u>0.13</u>		
1439	6L	5.237	33.3	3.96	273.9	102.73	23.9	<u>177.45</u> <u>0.13</u>		
1442	8L	5.509	33.3	3.82	273.6	102.9	23.3	<u>178.10</u> <u>0.13</u>		
1445	10L	5.758	33.5	3.74	273.6	103.4	23.2	<u>177.45</u> <u>0.13</u>		
1448	12L	5.821	33.5	3.77	273.0	101.1	22.7	<u>177.45</u> <u>0.13</u>		
1451	14L	5.823	33.4	3.75	272.4	99.4	22.1	<u>176.80</u> <u>0.13</u> <u>4.75</u>		
SAMPLED										
Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc <u>SAMPLED AFTER 14L PURGED, SLOW RECHARGE</u> <u>L-M TURB, CLEAR, NO SHEEN ABOVE</u>										
Container Volume (L)		No of containers	Preservative	Duplicates			Other Comments			
Glass amber (100-250ml)	2	none		Duplicate ID <u>G001</u> - 1x AMBER 2x VIAL						
Glass vial (40mL)	2	HCl								
Plastic (60mL) - metals*	1	HNO3		Triplicate ID <u>G001A</u> - 1x AMBER 2x VIAL						
Plastic (60mL) - cyanide, CrVI*	1	NaOH								
Plastic (60mL) - nutrients	1	H2SO4		Blanks <u>G001</u> - 1x AMBER, 2x VIAL						
Plastic (500mL) - inorganics	1	none								
Plastic () <u>PEBS</u>	1			Rinsate ID <u>R001</u> - 1x AMBER, 2x VIAL						
Plastic () <u>96106</u>	2									
				Rinsate ID <u>T001</u> - 2x VIAL						

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

Client: <u>GRR</u>		Job No: <u>J174436</u>		Well ID EMB14	
Project: <u>GME</u>		Sampled by: <u>VB</u>			
Location: <u>GRR & Vopak Site, East Arm</u>		Date: <u>17/12/21</u>			

WELL DETAILS			SAMPLING EQUIPMENT				*Other Sampling Equipment / Method	
Well depth:	<u>9.314</u>	(m)	Device:	<u>micropurge</u>	<u>peristaltic</u>	<u>footvalve</u>		<u>bailer</u>
Casing diameter:	<u>50</u>	(mm)	Method:	<u>low-flow</u>	<u>4-well-volume</u>	<u>purged dry</u>		
Casing type:	<u>PVC</u>	/ steel / other	WQM Make:	<u>YSI</u>				
Depth to product	<u>—</u>	(m bTOC)	WL Meter:	<u>interface</u>	<u>non-interface</u>			
Depth to water:	<u>—</u>	(m bTOC)	Screen (from - to), m	<u>6.314 - 9.314</u>				
Product thickness	<u>—</u>	(m)	Pump Depth (m bTOC)	<u>—</u>				

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
SUNNY, SLIGHT WIND

Purging instructions:
Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

Low Flow: The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume 50mm (2") diameter - 2 L/metre, 100mm (4") diameter - 8 L/metre, 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment <i>Turbidity, Colour, Odour, Sheen, etc</i> TDS SAL Turb mg/L PSU NTU
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond <u>µS/cm</u> / mS/cm	ORP mV	DO mg/L / ppm / %	
1534	1.27	3.806	34.9	5.69	224.8	90.2	34.6	
1537	2	4.642	35.0	5.96	224.2	82.7	35.0	~~224.6~~ 0.10 144.95
1540	4	5.419	35.1	6.09	219.6	79.6	35.0	143.00 0.10
1543	5.5	6.006	35.2	6.16	219.7	75.4	32.1	143.00 0.10
1547	7.0	6.476	35.4	6.26	213.3	70.6	30.7	138.45 0.10
1550	8.5	6.694	35.3	6.30	203.5	70.4	30.4	131.95 0.09
1553	10.0	7.096	35.2	6.36	194.9	72.0	34.2	120.25 0.08
1556	11.5	7.151	35.6	6.41	185.6	70.8	32.7	126.55 0.09
1559	13.0		35.1	6.39	204.7	68.	33.0	122.66 0.09 5.81

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc
SAMPLED AFTER 13L PURGED, SLOW RECHARGE
6-m TURB, CLEAR, NO SHEEN ODOUR

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments
Glass amber (100-250ml)	2	none	Duplicate ID	
Glass vial (40mL)	2	HCl		
Plastic (60mL) - metals*	1	HNO3	Triplicate ID	
Plastic (60mL) - cyanide, CrVI*	1	NaOH		
Plastic (60mL) - nutrients	1	H2SO4	Blanks Rinsate ID	
Plastic (500mL) - inorganics	1	none		
Plastic () <u>PFAS</u>	1			
Plastic () <u>alkaloids</u>	2			

*samples for dissolved metals to be filtered in the field prior to filling sampling container



Groundwater Monitoring Event – December 2021

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 3: Results Summary Tables (including QA/QC)

Groundwater Monitoring Results Table
September and December 2021

				SWL	Field Parameters								Metals																			
				Standing Water Level	Temperature	pH	Electrical Conductivity	Salinity	ORP	Dissolved Oxygen	Total Dissolved Solids	Turbidity	Antimony (Filtered)	Arsenic (Filtered)	Barium (filtered)	Beryllium (Filtered)	Boron (filtered)	Cadmium (Filtered)	Chromium (total) (Filtered)	Cobalt (Filtered)	Copper (Filtered)	Lead (Filtered)	Manganese (Filtered)	Mercury (Filtered)	Nickel (Filtered)	Selenium (Filtered)	Vanadium (Filtered)	Zinc (Filtered)				
				mbgl	°C	pH unit	(µS/cm)	PSU	mV	% Sat.	mg/L	NTU	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L						
EQL													1	1	1	1	50	0.1	1	1	1	1	1	0.1	1	10	10	5				
Monitoring Round		Field ID	Sampled Date	Lab Reports																												
Sep-21	EMB13	23/09/2021	827604 & ES2134300	5.803	36.8	7.24	281.3	0.13	-35.2	32.7	183.09	3.91	<1	<1	51	<1	<50	<0.2	<1	<1	3	2	35	<0.1	<1	1	<10	30				
	EMB14			6.465	33.3	5.41	377.6	0.18	93.2	18.4	250.26	6.09	<1	<1	213	<1	<50	<0.2	<1	<1	<1	<1	12	<0.1	<1	<1	<10	109				
Dec-21	EMB13	17/12/2021	852254, ESM2126049 & ES2146552	3.276	33.4	3.75	272.4	0.13	99.4	22.1	176.8	4.75	<1	1	50	<1	50	<1	<1	<1	3	<1	29	<0.1	1	10	<10	30				
	EMB14			3.416	35.1	6.39	204.7	0.09	68	33	122.6	5.81	<1	<1	363	<1	<50	<1	<1	<1	<1	4	<1	3	<0.1	1	10	<10	799			

**Groundwater Monitoring Results Table
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				Inorganics						Anions						Cations				TRH - NEPM 1999 Fractions					TRH - NEPM 2013 Fractions							
				Ammonium Ion (as N)	Nitrate + Nitrite (oxides of nitrogen) (as N)	Nitrogen (Total)	Kjeldahl Nitrogen Total	Phosphate total (P)	Cyanide (total)	Chloride	Sulphate (as SO4)	Carbonate Alkalinity (as CaCO3)	Bicarbonate Alkalinity (as CaCO3)	Hydroxide Alkalinity (as CaCO3)	Total Alkalinity (as CaCO3)	Calcium	Magnesium	Potassium	Sodium	C6 - C9	C10 - C14	C15 - C28	C29-C36	+C10- C36 (Sum of total)	Naphthalene	C6-C10	C6-C10 less BTEX (F1)	C10-C16	C10-C16 less NAPHTHALENE	C16-C34	C34-C40	C10 - C40 (Sum of total)
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
EQL				10	50	200	200	10	5	1000	5000	10000	2000	20000	20000	500	500	500	500	20	50	100	100	100	1	20	20	50	50	100	100	100
Monitoring Round	Field ID	Sampled Date	Lab Reports																													
Sep-21	EMB13	23/09/2021	827604 & ES2134300	90	5800	6300	500	<10	6	77000	<5000	<10000	<20000	<20000	<20000	1000	800	1000	18000	<20	<50	<100	<100	<100	<10	<20	<20	<50	<50	<100	<100	<100
	EMB14			90	9700	11200	1500	20	<5	67000	<5000	<10000	<20000	<20000	<35000	12000	2300	3600	18000	<20	<50	<100	<100	<100	<10	<20	<20	<50	<50	<100	<100	<100
Dec-21	EMB13	17/12/2021	852254, ESM2126049 & ES2146552	30	5000	5000	<200	10	110	45000	5300	<10000	<20000	<20000	<20000	1000	700	1100	18000	<20	<50	<100	<100	<100	<10	<20	<20	<50	<50	<100	<100	<100
	EMB14			<10	15000	15800	800	20	38	6100	14000	<10000	26000	<20000	26,000	28000	1700	3200	3800	<20	<50	<100	<100	<100	<10	<20	<20	<50	<50	<100	<100	<100

**Groundwater Monitoring Results Table
September and December 2021**

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				MAH								PAH																
				Benzene	Ethylbenzene	Isopropyl benzene (umene)	Styrene	Toluene	Xylene (m & p)	Xylene (o)	Xylene Total	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo[b+i]fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Sum of total)
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL				1	1	1	1	1	2	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Monitoring Round	Field ID	Sampled Date	Lab Reports																									
Sep-21	EMB13	23/09/2021	827604 & ES2134300	<1	<1	<1	<1	<1	<2	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
	EMB14			<1	<1	<1	<1	<1	<2	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
Dec-21	EMB13	17/12/2021	852254, ESM2126049 & ES2146552	<1	<1	<1	<1	<1	<2	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
	EMB14			<1	<1	<1	<1	<1	<2	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		

**Groundwater Monitoring Results Table
September and December 2021**

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				PCBs								Phenols (Halogenated)								Phenols (non-Halogenated)										Glycols					
				Aroclor-1016	Aroclor-1221	Aroclor-1232	Aroclor-1242	Aroclor-1248	Aroclor-1254	Aroclor-1260	Total PCB*	2-Chlorophenol	2,4-Dichlorophenol	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,6-Dichlorophenol	4-Chloro-3-methylphenol	Pentachlorophenol	Tetrachlorophenols - Total	Total Halogenated Phenol*	2-Cyclohexyl-4,6-dinitrophenol	2-Methyl-4,6-dinitrophenol	2-Methylphenol (o-Cresol)	2-Nitrophenol	2,4-Dimethylphenol	2,4-Dinitrophenol	3&4-Methylphenol (m&p-Cresol)	4-Nitrophenol	Dinoseb	Phenol	Total Non-Halogenated Phenol*	Di-Ethylene Glycol	Ethylene glycol	Propylene glycol	Triethylene glycol
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL				1	1	1	1	1	1	1	1	3	3	10	10	3	10	10	30	10	100	30	3	10	3	30	6	30	100	3	100	20000	20000	20000	20000
Monitoring Round		Field ID	Sampled Date	Lab Reports																															
Sep-21	EMB13	23/09/2021	827604 & ES2134300	<1	<1	<1	<1	<1	<1	<1	<1	<3	<3	<10	<10	<3	<10	<10	<3	<10	<100	<30	<3	<10	<3	<30	<6	<30	<100	<3	<100	<20000	<20000	<20000	<20000
	EMB14			<1	<1	<1	<1	<1	<1	<1	<1	<3	<3	<10	<10	<3	<10	<10	<3	<10	<100	<30	<3	<10	<3	<30	<6	<30	<100	<3	<100	<20000	<20000	<20000	<20000
Dec-21	EMB13	17/12/2021	852254, ESM2126049 & ES2146552	<1	<1	<1	<1	<1	<1	<1	<3	<3	<10	<10	<3	<10	<10	<3	<10	<100	<30	<3	<10	<3	<30	<6	<30	<100	<3	<100	<20000	<20000	<20000	<20000	
	EMB14			<1	<1	<1	<1	<1	<1	<1	<3	<3	<10	<10	<3	<10	<10	<3	<10	<100	<30	<3	<10	<3	<30	<6	<30	<100	<3	<100	<20000	<20000	<20000	<20000	

**Groundwater Monitoring Results Table
September and December 2021**

				PFAS - Perfluoroalkyl carboxylic acids (PFCAs)											PFAS - Perfluoroalkyl sulfonamido substances								PFAS - Perfluoroalkyl sulfonic acids (PFSAs)								
				Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoDA)	Perfluorotridecanoic acid (PFTriDA)	Perfluorotetradecanoic acid (PFTeDA)	2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	Perfluorooctane sulfonamide (FOSA)	Perfluorobutanesulfonic acid (PFBS)	Perfluorononanesulfonic acid (PFNS)	Perfluoropropanesulfonic acid (PFPS)	Perfluoropentanesulfonic acid (PFPeS)	Perfluorohexanesulfonic acid (PFHxS)	Perfluoroheptanesulfonic acid (PFHpS)	Perfluorooctanesulfonic acid (PFOS)	Perfluorodecanesulfonic acid (PFDS)		
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
EQL				0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01		
Monitoring Round	Field ID	Sampled Date	Lab Reports																												
Sep-21	EMB13	23/09/2021	827604 & ES2134300	1	5.5	5.4	1.7	1.2	0.04	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
	EMB14			0.56	1.4	1.1	1.0	0.29	0.1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	
Dec-21	EMB13	17/12/2021	852254, ESM2126049 & ES2146552	0.8	4.5	3.8	1.4	0.97	0.03	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
	EMB14			0.17	0.28	0.21	0.27	0.09	0.08	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	

**Groundwater Monitoring Results Table
September and December 2021**

				PFAS - n:2 Fluorotelomer sulfonic acids (n:2 FTSA)				PFASs Summations				
				1H,1H,2H,2H-perfluorohexanesulfonic acid (4:2 FTSA)	1H,1H,2H,2H-perfluorooctanesulfonic acid (6:2 FTSA)	1H,1H,2H,2H-perfluorodecanesulfonic acid (8:2 FTSA)	1H,1H,2H,2H-perfluorododecanesulfonic acid (10:2 FTSA)	Sum (PFHxS + PFOS)	Sum of US EPA PFAS (PFOS + PFOA)	Sum of enHealth PFAS (PFHxS + PFOS + PFOA)	Sum of WA DWER PFAS (n=10)	Sum of PFASs (n=30)
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL				0.01	0.05	0.01	0.01	0.01	0.01	0.01	0.05	0.1
Monitoring Round	Field ID	Sampled Date	Lab Reports									
Sep-21	EMB13	23/09/2021	827604 & ES2134300	0.04	40	61	< 0.01	<0.01	1.2	1.2	55.41	55.49
	EMB14			<0.01	<0.05	<0.01	< 0.01	<0.01	0.29	0.29	4.35	4.45
Dec-21	EMB13	17/12/2021	852254, ESM2126049 & ES2146552	0.03	1.6	1.1	< 0.01	<0.01	0.97	0.97	14.17	14.23
	EMB14			<0.01	<0.05	<0.01	< 0.01	<0.01	0.09	0.09	1.02	1.1

			Lab Report Number	852254	852254		852254	ES2146552	
			Field ID	EMB13	QC01	RPD	EMB13	QC01A	RPD
			Sampled Date/Time	17/12/2021	17/12/2021		17/12/2021	17/12/2021	
Chem_Group	ChemName	Units	EQL						
BTEX	Benzene	ug/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Ethylbenzene	ug/l	1 (Primary): 2 (Interlab)	<1.0	<1.0	0	<1.0	<2.0	0
	Toluene	ug/l	1 (Primary): 2 (Interlab)	<1.0	<1.0	0	<1.0	<2.0	0
	Xylene (m & p)	ug/l	2	<2.0	<2.0	0	<2.0	<2.0	0
	Xylene (o)	ug/l	1 (Primary): 2 (Interlab)	<1.0	<1.0	0	<1.0	<2.0	0
	Xylene Total	ug/l	3 (Primary): 2 (Interlab)	<3.0	<3.0	0	<3.0	<2.0	0
	C6-C10 less BTEX (F1)	mg/l	0.02	<0.02	<0.02	0	<0.02	<0.02	0
Halogenated Phenols	2,4,5-trichlorophenol	ug/l	10	<10.0	<10.0	0	<10.0		
	2,4,6-trichlorophenol	ug/l	10	<10.0	<10.0	0	<10.0		
	2,4-dichlorophenol	ug/l	3	<3.0	<3.0	0	<3.0		
	2,6-dichlorophenol	ug/l	3	<3.0	<3.0	0	<3.0		
	2-chlorophenol	ug/l	3	<3.0	<3.0	0	<3.0		
	Pentachlorophenol	ug/l	10	<10.0	<10.0	0	<10.0		
	tetrachlorophenols	ug/l	30	<30.0	<30.0	0	<30.0		
Herbicides	Dinoseb	ug/l	100	<100.0	<100.0	0	<100.0		
PAH	Benzo(b+j)fluoranthene	mg/l	0.001	<0.001	<0.001	0	<0.001		
PAH/Phenols	2,4-dimethylphenol	ug/l	3	<3.0	<3.0	0	<3.0		
	2,4-dinitrophenol	mg/l	0.03	<0.03	<0.03	0	<0.03		
	2-methylphenol	ug/l	3	<3.0	<3.0	0	<3.0		
	2-nitrophenol	ug/l	10	<10.0	<10.0	0	<10.0		
	3-&4-methylphenol	ug/l	6	<6.0	<6.0	0	<6.0		
	4,6-Dinitro-2-methylphenol	ug/l	30	<30.0	<30.0	0	<30.0		
	4-chloro-3-methylphenol	ug/l	10	<10.0	<10.0	0	<10.0		
	4-nitrophenol	ug/l	30	<30.0	<30.0	0	<30.0		
	Acenaphthene	ug/l	1	<1.0	<1.0	0	<1.0		
	Acenaphthylene	ug/l	1	<1.0	<1.0	0	<1.0		
	Anthracene	ug/l	1	<1.0	<1.0	0	<1.0		
	Benzo(a)anthracene	ug/l	1	<1.0	<1.0	0	<1.0		
	Benzo(a) pyrene	ug/l	1	<1.0	<1.0	0	<1.0		
	Benzo(g,h,i)perylene	ug/l	1	<1.0	<1.0	0	<1.0		
	Benzo(k)fluoranthene	ug/l	1	<1.0	<1.0	0	<1.0		
	Chrysene	ug/l	1	<1.0	<1.0	0	<1.0		
	Cresol Total	mg/l	0.01	<0.01	<0.01	0	<0.01		
	Dibenz(a,h)anthracene	ug/l	1	<1.0	<1.0	0	<1.0		
	Fluoranthene	ug/l	1	<1.0	<1.0	0	<1.0		
	Fluorene	ug/l	1	<1.0	<1.0	0	<1.0		
Phenolics	Indeno(1,2,3-c,d)pyrene	ug/l	1	<1.0	<1.0	0	<1.0		
	Naphthalene	ug/l	10 (Primary): 5 (Interlab)	<10.0	<10.0	0	<10.0	<5.0	0
	Naphthalene	ug/l	1 (Primary): 5 (Interlab)	<1.0	<1.0	0	<1.0	<5.0	0
	PAHs (Sum of total)	ug/l	1	<1.0	<1.0	0	<1.0		
	Phenanthrene	ug/l	1	<1.0	<1.0	0	<1.0		
	Phenol	ug/l	3	<3.0	<3.0	0	<3.0		
	Pyrene	ug/l	1	<1.0	<1.0	0	<1.0		
	4,6-Dinitro-o-cyclohexyl phenol	ug/l	100	<100.0	<100.0	0	<100.0		
	Phenols (Total Halogenated)	mg/l	0.01	<0.01	<0.01	0	<0.01		
	Phenols (Total Non Halogenated)	mg/l	0.1	<0.1	<0.1	0	<0.1		
TPH	C10-C16	mg/l	0.05 (Primary): 0.1 (Interlab)	<0.05	<0.05	0	<0.05	<0.1	0
	C16-C34	mg/l	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	C34-C40	mg/l	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	F2-NAPHTHALENE	mg/l	0.05 (Primary): 0.1 (Interlab)	<0.05	<0.05	0	<0.05	<0.1	0
	+C10 - C36 (Sum of total)	ug/l	100 (Primary): 50 (Interlab)	<100.0	<100.0	0	<100.0	<50.0	0
	C6 - C9	ug/l	20	<20.0	<20.0	0	<20.0	<20.0	0
	C10 - C14	ug/l	50	<50.0	<50.0	0	<50.0	<50.0	0
	C15 - C28	ug/l	100	<100.0	<100.0	0	<100.0	<100.0	0
	C29-C36	ug/l	100 (Primary): 50 (Interlab)	<100.0	<100.0	0	<100.0	<50.0	0
	C10 - C40 (Sum of total)	ug/l	100	<100.0	<100.0	0	<100.0	<100.0	0
	C6-C10	mg/l	0.02	<0.02	<0.02	0	<0.02	<0.02	0

			Lab Report Number	852254	852254
			Field ID	RB01	TB01
			Sampled_Date/Time	17/12/2021	17/12/2021
			Sample Type	Rinsate	Trip_B
Chem_Group	ChemName	Units	EQL		
	Perfluorooctanoate	mg/l	0.00001		
BTEX	Benzene	µg/L	1	<1	<1
	Ethylbenzene	µg/L	1	<1	<1
	Toluene	µg/l	1	<1	<1
	Total BTEX	mg/l	0.001		
	Xylene (m & p)	µg/l	2	<2	<2
	Xylene (o)	µg/l	1	<1	<1
	Xylene Total	µg/l	2	<3	<3
	C6-C10 less BTEX (F1)	mg/l	0.02	<0.02	<0.02
	Naphthalene	µg/l	1	<10	<10
TPH	C10-C16	mg/l	0.05	<0.05	
	C16-C34	mg/l	0.1	<0.1	
	C34-C40	mg/l	0.1	<0.1	
	F2-NAPHTHALENE	mg/l	0.05	<0.05	
	+C10 - C36 (Sum of total)	µg/l	50	<100	
	C6 - C9	µg/L	20	<20	<20
	C10 - C14	µg/l	50	<50	
	C15 - C28	µg/l	100	<100	
	C29-C36	µg/L	50	<100	
	C10 - C40 (Sum of total)	µg/L	100	<100	
	C6-C10	mg/l	0.02	<0.02	<0.02



Groundwater Monitoring Event – December 2021

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Appendix A: Environmental Protection Licence 229-01



Groundwater Monitoring Event – December 2021

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Appendix B: Laboratory Certificates of Analysis

RE: [EXT]:Eurofins Sample Receipt Advice - Report 852254 : Site GROUNDWATER MONITORING (J174436)**Varun Bhagwat** <Varun.Bhagwat@greencap.com.au>

Thu 23/12/2021 12:58 PM

To: #AU_CAU001_EnviroSampleVic <EnviroSampleVic@eurofins.com>; Michael Morrison <MichaelMorrison@eurofins.com>

Cc: #AU09_EnviroSampleDRW <EnviroSampleDRW@eurofins.com>

EXTERNAL EMAIL*

Hi Michael,

Thanks for sending that through.

I'm meant to have sent 4 x 40ml glass vials for glycol analysis to the ALS labs but I might have accidentally mixed them up and sent to the Eurofins lab.

Can you please check if you have these vials?

There should be two for sample EMB13 and two for EMB14. The vials should be the ALS ones for glycol analysis.

Please let me know if you are able to locate them.

Thank you.

Cheers,

852254
23/12/21De 51147 - UV
De 51148 - UV.**Varun Bhagwat**

Environmental Consultant | Greencap

Unit 11 / 14 Winnellie Road Winnellie, NT 0820

M: 0428 829 444 | E: Varun.Bhagwat@greencap.com.au | in: [LinkedIn](#)**GREENCAP**
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Shutdown:**Greencap offices will be closed from **Fri 24 Dec 2021** returning **Mon 10 Jan 2022**
Click here for **Emergency Contacts** for urgent works during this period

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

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Eurofins ARL Pty Ltd

ABN: 91 05 0159 898

Eurofins Environment Testing NZ Limited

NZBN: 9429046024954

Sample Receipt Advice

Company name:	Greencap NT P/L
Contact name:	Varun
Project name:	GROUNDWATER MONITORING
Project ID:	J174436
Turnaround time:	10 Day
Date/Time received	Dec 21, 2021 4:42 PM
Eurofins reference	852254

Sample Information

- ✓ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ✓ All samples have been received as described on the above COC.
- ✓ COC has been completed correctly.
- ✓ Attempt to chill was evident.
- ✓ Appropriately preserved sample containers have been used.
- ✓ All samples were received in good condition.
- ✓ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ✓ Appropriate sample containers have been used.
- ✓ Sample containers for volatile analysis received with zero headspace.
- ✗ Split sample sent to requested external lab.
- ✗ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Notes

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Michael Morrison on phone : 03 8564 5933 or by email: MichaelMorrison@eurofins.com

Results will be delivered electronically via email to Varun - varun.bhagwat@greencap.com.au.

Note: A copy of these results will also be delivered to the general Greencap NT P/L email address.

Greencap NT P/L
11/14 Winnellie Road
Winnellie
NT 0800



NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention: Varun

Report 852254-W
Project name GROUNDWATER MONITORING
Project ID J174436
Received Date Dec 21, 2021

Client Sample ID			EMB13 Water M21-De51147 Dec 17, 2021	EMB14 Water M21-De51148 Dec 17, 2021	QC01 Water M21-De51149 Dec 17, 2021	RB01 Water M21-De51150 Dec 17, 2021
Sample Matrix						
Eurofins Sample No.						
Date Sampled						
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Naphthalene ^{N02}	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2) ^{N01}	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	96	101	97	100
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Benzo(b&j)fluoranthene ^{N07}	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Indeno(1,2,3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-

Client Sample ID			EMB13 Water M21-De51147 Dec 17, 2021	EMB14 Water M21-De51148 Dec 17, 2021	QC01 Water M21-De51149 Dec 17, 2021	RB01 Water M21-De51150 Dec 17, 2021
Sample Matrix						
Eurofins Sample No.						
Date Sampled						
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
2-Fluorobiphenyl (surr.)	1	%	110	114	71	-
p-Terphenyl-d14 (surr.)	1	%	111	113	125	-
Polychlorinated Biphenyls						
Aroclor-1016	0.005	mg/L	< 0.005	< 0.005	-	-
Aroclor-1221	0.005	mg/L	< 0.005	< 0.005	-	-
Aroclor-1232	0.005	mg/L	< 0.005	< 0.005	-	-
Aroclor-1242	0.005	mg/L	< 0.005	< 0.005	-	-
Aroclor-1248	0.005	mg/L	< 0.005	< 0.005	-	-
Aroclor-1254	0.005	mg/L	< 0.005	< 0.005	-	-
Aroclor-1260	0.005	mg/L	< 0.005	< 0.005	-	-
Total PCB*	0.005	mg/L	< 0.005	< 0.005	-	-
Dibutylchloroendate (surr.)	1	%	55	61	-	-
Tetrachloro-m-xylene (surr.)	1	%	82	87	-	-
Phenols (Halogenated)						
2-Chlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
2,4-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
2,4,5-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
2,4,6-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
2,6-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
Pentachlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
Tetrachlorophenols - Total	0.03	mg/L	< 0.03	< 0.03	< 0.03	-
Total Halogenated Phenol*	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
Phenols (non-Halogenated)						
2-Cyclohexyl-4,6-dinitrophenol	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
2-Methyl-4,6-dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	-
2-Nitrophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
2,4-Dimethylphenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
2,4-Dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	-
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006	< 0.006	< 0.006	-
Total cresols*	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
4-Nitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	-
Dinoseb	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
Phenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
Phenol-d6 (surr.)	1	%	43	32	39	-
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
Ammonia (as N)	0.01	mg/L	0.03	< 0.01	-	-
Chloride	1	mg/L	45	6.1	-	-
Cyanide (total)	0.005	mg/L	0.11	0.038	-	-
Nitrate & Nitrite (as N)	0.05	mg/L	5.0	15	-	-
Phosphate total (as P)	0.01	mg/L	0.01	0.02	-	-
Sulphate (as SO4)	5	mg/L	5.3	14	-	-
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	< 0.2	0.8	-	-
Total Nitrogen (as N)*	0.2	mg/L	5	15.8	-	-

Client Sample ID			EMB13 Water M21-De51147 Dec 17, 2021	EMB14 Water M21-De51148 Dec 17, 2021	QC01 Water M21-De51149 Dec 17, 2021	RB01 Water M21-De51150 Dec 17, 2021
Sample Matrix						
Eurofins Sample No.						
Date Sampled						
Test/Reference	LOR	Unit				
Alkalinity (speciated)						
Bicarbonate Alkalinity (as CaCO ₃)	20	mg/L	< 20	26	-	-
Carbonate Alkalinity (as CaCO ₃)	10	mg/L	< 10	< 10	-	-
Hydroxide Alkalinity (as CaCO ₃)	20	mg/L	< 20	< 20	-	-
Total Alkalinity (as CaCO ₃)	20	mg/L	< 20	26	-	-
Alkali Metals						
Calcium	0.5	mg/L	1.0	28	-	-
Magnesium	0.5	mg/L	0.7	1.7	-	-
Potassium	0.5	mg/L	1.1	3.2	-	-
Sodium	0.5	mg/L	18	3.8	-	-
Perfluoroalkyl carboxylic acids (PFCAs)						
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	0.80	0.17	-	-
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	4.5	0.28	-	-
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	3.8	0.21	-	-
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.01	ug/L	1.4	0.27	-	-
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	0.97	0.09	-	-
Perfluorononanoic acid (PFNA) ^{N11}	0.01	ug/L	0.03	0.08	-	-
Perfluorodecanoic acid (PFDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluoroundecanoic acid (PFUnDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorododecanoic acid (PFDoDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorotridecanoic acid (PFTeDA) ^{N15}	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	-	-
13C4-PFBA (surr.)	1	%	83	82	-	-
13C5-PFPeA (surr.)	1	%	147	93	-	-
13C5-PFHxA (surr.)	1	%	74	88	-	-
13C4-PFHpA (surr.)	1	%	77	78	-	-
13C8-PFOA (surr.)	1	%	72	80	-	-
13C5-PFNA (surr.)	1	%	75	74	-	-
13C6-PFDA (surr.)	1	%	80	110	-	-
13C2-PFUnDA (surr.)	1	%	20	20	-	-
13C2-PFDoDA (surr.)	1	%	18	15	-	-
13C2-PFTeDA (surr.)	1	%	int	int	-	-
Perfluoroalkyl sulfonamido substances						
Perfluorooctane sulfonamide (FOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	-	-
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	-	-
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	-	-
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE) ^{N11}	0.05	ug/L	< 0.05	< 0.05	-	-
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE) ^{N11}	0.05	ug/L	< 0.05	< 0.05	-	-
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	-	-
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	-	-
13C8-FOSA (surr.)	1	%	35	56	-	-
D3-N-MeFOSA (surr.)	1	%	108	56	-	-
D5-N-EtFOSA (surr.)	1	%	35	16	-	-
D7-N-MeFOSE (surr.)	1	%	13	int	-	-
D9-N-EtFOSE (surr.)	1	%	22	14	-	-
D5-N-EtFOSAA (surr.)	1	%	int	int	-	-
D3-N-MeFOSAA (surr.)	1	%	int	11	-	-

Client Sample ID			EMB13 Water M21-De51147 Dec 17, 2021	EMB14 Water M21-De51148 Dec 17, 2021	QC01 Water M21-De51149 Dec 17, 2021	RB01 Water M21-De51150 Dec 17, 2021
Sample Matrix						
Eurofins Sample No.						
Date Sampled						
Test/Reference	LOR	Unit				
Perfluoroalkyl sulfonic acids (PFASs)						
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorononanesulfonic acid (PFNS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluoropropanesulfonic acid (PFPrS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	-	-
13C3-PFBS (surr.)	1	%	83	93	-	-
18O2-PFHxS (surr.)	1	%	99	103	-	-
13C8-PFOS (surr.)	1	%	51	76	-	-
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)						
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	0.01	ug/L	0.03	< 0.01	-	-
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA) ^{N11}	0.05	ug/L	1.6	< 0.05	-	-
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	0.01	ug/L	1.1	< 0.01	-	-
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	-	-
13C2-4:2 FTSA (surr.)	1	%	72	66	-	-
13C2-6:2 FTSA (surr.)	1	%	127	91	-	-
13C2-8:2 FTSA (surr.)	1	%	86	82	-	-
13C2-10:2 FTSA (surr.)	1	%	13	11	-	-
PFASs Summations						
Sum (PFHxS + PFOS)*	0.01	ug/L	< 0.01	< 0.01	-	-
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	0.97	0.09	-	-
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	0.97	0.09	-	-
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	14.17	1.02	-	-
Sum of PFASs (n=30)*	0.1	ug/L	14.23	1.1	-	-

Client Sample ID			TB01 Water M21-De51151 Dec 17, 2021
Sample Matrix			
Eurofins Sample No.			
Date Sampled			
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons			
TRH C6-C9	0.02	mg/L	< 0.02
Naphthalene ^{N02}	0.01	mg/L	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	< 0.02
BTEX			
Benzene	0.001	mg/L	< 0.001
Toluene	0.001	mg/L	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002
o-Xylene	0.001	mg/L	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003
4-Bromofluorobenzene (surr.)	1	%	94

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Jan 10, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Dec 30, 2021	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons	Melbourne	Dec 30, 2021	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	Dec 30, 2021	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Eurofins Suite B4A			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Jan 10, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Melbourne	Dec 30, 2021	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (Halogenated)	Melbourne	Dec 30, 2021	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (non-Halogenated)	Melbourne	Dec 30, 2021	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Polychlorinated Biphenyls	Melbourne	Dec 30, 2021	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8082)			
Ammonia (as N)	Melbourne	Dec 30, 2021	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Cyanide (total)	Melbourne	Dec 30, 2021	14 Days
- Method: LTM-INO-4020 Total Free WAD Cyanide by CFA			
Eurofins Suite B11C: Na/K/Ca/Mg	Melbourne	Dec 30, 2021	180 Days
- Method: LTM-MET-3010 Alkali Metals by ICP-AES			
Eurofins Suite B11E: Cl/SO4/Alkalinity			
Chloride	Melbourne	Dec 30, 2021	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
Sulphate (as SO4)	Melbourne	Dec 30, 2021	28 Days
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
Alkalinity (speciated)	Melbourne	Dec 30, 2021	14 Days
- Method: LTM-INO-4250 Alkalinity by Electrometric Titration			
Total Nitrogen Set (as N)			
Nitrate & Nitrite (as N)	Melbourne	Dec 30, 2021	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Total Kjeldahl Nitrogen (as N)	Melbourne	Dec 30, 2021	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Eurofins Suite B19A: Total N (TKN, NOx), Total P			
Phosphate total (as P)	Melbourne	Dec 30, 2021	28 Days
- Method: LTM-INO-4040 Phosphate by CFA			
Per- and Polyfluoroalkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs)	Melbourne	Dec 30, 2021	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Melbourne	Dec 30, 2021	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFASs)	Melbourne	Dec 30, 2021	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Melbourne	Dec 30, 2021	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
PFASs Summations	Melbourne	Dec 21, 2021	
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

Company Name: Greencap NT P/L
Address: 11/14 Winnellie Road
Winnellie
NT 0800

Project Name: GROUNDWATER MONITORING
Project ID: J174436

Order No.: PO296185
Report #: 852254
Phone: 61 8 8984 4244
Fax: 61 8 8984 3105

Received: Dec 21, 2021 4:42 PM
Due: Jan 6, 2022
Priority: 10 Day
Contact Name: Varun

Eurofins Analytical Services Manager : Michael Morrison

Sample Detail						Ammonia (as N)	Cyanide (total)	Polychlorinated Biphenyls	BTEX and Naphthalene	Total Recoverable Hydrocarbons	Eurofins Suite B4A	Eurofins Suite B19A: Total N (TKN, NOx), Total P	Eurofins Suite B11E: Cl/SO4/Alkalinity	Per- and Polyfluoroalkyl Substances (PFASs)	Eurofins Suite B11C: Na/K/Ca/Mg
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA # 1261 Site # 18217															
Brisbane Laboratory - NATA # 1261 Site # 20794															
Mayfield Laboratory - NATA # 1261 Site # 25079															
Perth Laboratory - NATA # 2377 Site # 2370															
External Laboratory															
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID										
1	EMB13	Dec 17, 2021		Water	M21-De51147	X	X	X			X	X	X	X	X
2	EMB14	Dec 17, 2021		Water	M21-De51148	X	X	X			X	X	X	X	X
3	QC01	Dec 17, 2021		Water	M21-De51149						X				
4	RB01	Dec 17, 2021		Water	M21-De51150				X	X					
5	TB01	Dec 17, 2021		Water	M21-De51151				X	X					
Test Counts						2	2	2	2	2	3	2	2	2	2

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	µg/L: micrograms per litre
ppm: parts per million	ppb: parts per billion	%: Percentage
org/100mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.4
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
Naphthalene	mg/L	< 0.01			0.01	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total*	mg/L	< 0.003			0.003	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/L	< 0.001			0.001	Pass	
Acenaphthylene	mg/L	< 0.001			0.001	Pass	
Anthracene	mg/L	< 0.001			0.001	Pass	
Benz(a)anthracene	mg/L	< 0.001			0.001	Pass	
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.001			0.001	Pass	
Benzo(g,h,i)perylene	mg/L	< 0.001			0.001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.001			0.001	Pass	
Chrysene	mg/L	< 0.001			0.001	Pass	
Dibenz(a,h)anthracene	mg/L	< 0.001			0.001	Pass	
Fluoranthene	mg/L	< 0.001			0.001	Pass	
Fluorene	mg/L	< 0.001			0.001	Pass	
Indeno(1,2,3-cd)pyrene	mg/L	< 0.001			0.001	Pass	
Naphthalene	mg/L	< 0.001			0.001	Pass	
Phenanthrene	mg/L	< 0.001			0.001	Pass	
Pyrene	mg/L	< 0.001			0.001	Pass	
Method Blank							
Polychlorinated Biphenyls							
Aroclor-1016	mg/L	< 0.005			0.005	Pass	
Aroclor-1221	mg/L	< 0.005			0.005	Pass	
Aroclor-1232	mg/L	< 0.005			0.005	Pass	
Aroclor-1242	mg/L	< 0.005			0.005	Pass	
Aroclor-1248	mg/L	< 0.005			0.005	Pass	
Aroclor-1254	mg/L	< 0.005			0.005	Pass	
Aroclor-1260	mg/L	< 0.005			0.005	Pass	
Total PCB*	mg/L	< 0.005			0.005	Pass	
Method Blank							
Phenols (Halogenated)							
2-Chlorophenol	mg/L	< 0.003			0.003	Pass	
2,4-Dichlorophenol	mg/L	< 0.003			0.003	Pass	
2,4,5-Trichlorophenol	mg/L	< 0.01			0.01	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
2,4,6-Trichlorophenol	mg/L	< 0.01			0.01	Pass	
2,6-Dichlorophenol	mg/L	< 0.003			0.003	Pass	
4-Chloro-3-methylphenol	mg/L	< 0.01			0.01	Pass	
Pentachlorophenol	mg/L	< 0.01			0.01	Pass	
Tetrachlorophenols - Total	mg/L	< 0.03			0.03	Pass	
Method Blank							
Phenols (non-Halogenated)							
2-Cyclohexyl-4,6-dinitrophenol	mg/L	< 0.1			0.1	Pass	
2-Methyl-4,6-dinitrophenol	mg/L	< 0.03			0.03	Pass	
2-Nitrophenol	mg/L	< 0.01			0.01	Pass	
2,4-Dimethylphenol	mg/L	< 0.003			0.003	Pass	
2,4-Dinitrophenol	mg/L	< 0.03			0.03	Pass	
2-Methylphenol (o-Cresol)	mg/L	< 0.003			0.003	Pass	
3&4-Methylphenol (m&p-Cresol)	mg/L	< 0.006			0.006	Pass	
4-Nitrophenol	mg/L	< 0.03			0.03	Pass	
Dinoseb	mg/L	< 0.1			0.1	Pass	
Phenol	mg/L	< 0.003			0.003	Pass	
Method Blank							
Ammonia (as N)	mg/L	< 0.01			0.01	Pass	
Chloride	mg/L	< 1			1	Pass	
Cyanide (total)	mg/L	< 0.005			0.005	Pass	
Nitrate & Nitrite (as N)	mg/L	< 0.05			0.05	Pass	
Phosphate total (as P)	mg/L	< 0.01			0.01	Pass	
Sulphate (as SO ₄)	mg/L	< 5			5	Pass	
Total Kjeldahl Nitrogen (as N)	mg/L	< 0.2			0.2	Pass	
Method Blank							
Alkalinity (speciated)							
Bicarbonate Alkalinity (as CaCO ₃)	mg/L	< 20			20	Pass	
Carbonate Alkalinity (as CaCO ₃)	mg/L	< 10			10	Pass	
Hydroxide Alkalinity (as CaCO ₃)	mg/L	< 20			20	Pass	
Total Alkalinity (as CaCO ₃)	mg/L	< 20			20	Pass	
Method Blank							
Alkali Metals							
Calcium	mg/L	< 0.5			0.5	Pass	
Magnesium	mg/L	< 0.5			0.5	Pass	
Potassium	mg/L	< 0.5			0.5	Pass	
Sodium	mg/L	< 0.5			0.5	Pass	
Method Blank							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	ug/L	< 0.05			0.05	Pass	
Perfluoropentanoic acid (PFPeA)	ug/L	< 0.01			0.01	Pass	
Perfluorohexanoic acid (PFHxA)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanoic acid (PFHpA)	ug/L	< 0.01			0.01	Pass	
Perfluorooctanoic acid (PFOA)	ug/L	< 0.01			0.01	Pass	
Perfluorononanoic acid (PFNA)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanoic acid (PFDA)	ug/L	< 0.01			0.01	Pass	
Perfluoroundecanoic acid (PFUnDA)	ug/L	< 0.01			0.01	Pass	
Perfluorododecanoic acid (PFDoDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotridecanoic acid (PFTeDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotetradecanoic acid (PFTeDA)	ug/L	< 0.01			0.01	Pass	
Method Blank							
Perfluoroalkyl sulfonamido substances							
Perfluorooctane sulfonamide (FOSA)	ug/L	< 0.05			0.05	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	ug/L	< 0.05			0.05	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	ug/L	< 0.05			0.05	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	ug/L	< 0.05			0.05	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	ug/L	< 0.05			0.05	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	ug/L	< 0.05			0.05	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	ug/L	< 0.05			0.05	Pass	
Method Blank							
Perfluoroalkyl sulfonic acids (PFSA's)							
Perfluorobutanesulfonic acid (PFBS)	ug/L	< 0.01			0.01	Pass	
Perfluorononanesulfonic acid (PFNS)	ug/L	< 0.01			0.01	Pass	
Perfluoropropanesulfonic acid (PFPrS)	ug/L	< 0.01			0.01	Pass	
Perfluoropentanesulfonic acid (PFPeS)	ug/L	< 0.01			0.01	Pass	
Perfluorohexanesulfonic acid (PFHxS)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	ug/L	< 0.01			0.01	Pass	
Perfluorooctanesulfonic acid (PFOS)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanesulfonic acid (PFDS)	ug/L	< 0.01			0.01	Pass	
Method Blank							
n:2 Fluorotelomer sulfonic acids (n:2 FTSA's)							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	ug/L	< 0.05			0.05	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	ug/L	< 0.01			0.01	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons							
TRH C6-C9	%	108			70-130	Pass	
TRH C10-C14	%	111			70-130	Pass	
Naphthalene	%	75			70-130	Pass	
TRH C6-C10	%	107			70-130	Pass	
TRH >C10-C16	%	119			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	103			70-130	Pass	
Toluene	%	99			70-130	Pass	
Ethylbenzene	%	96			70-130	Pass	
m&p-Xylenes	%	97			70-130	Pass	
Xylenes - Total*	%	98			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	97			70-130	Pass	
Acenaphthylene	%	92			70-130	Pass	
Anthracene	%	94			70-130	Pass	
Benz(a)anthracene	%	89			70-130	Pass	
Benzo(a)pyrene	%	86			70-130	Pass	
Benzo(b&j)fluoranthene	%	116			70-130	Pass	
Benzo(g,h,i)perylene	%	101			70-130	Pass	
Benzo(k)fluoranthene	%	96			70-130	Pass	
Chrysene	%	110			70-130	Pass	
Dibenz(a,h)anthracene	%	88			70-130	Pass	
Fluoranthene	%	81			70-130	Pass	
Fluorene	%	89			70-130	Pass	
Indeno(1,2,3-cd)pyrene	%	101			70-130	Pass	
Naphthalene	%	89			70-130	Pass	
Phenanthrene	%	91			70-130	Pass	
Pyrene	%	88			70-130	Pass	
LCS - % Recovery							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Polychlorinated Biphenyls							
Aroclor-1260	%	78			70-130	Pass	
LCS - % Recovery							
Phenols (Halogenated)							
2-Chlorophenol	%	80			25-140	Pass	
2,4-Dichlorophenol	%	73			25-140	Pass	
2,4,5-Trichlorophenol	%	70			25-140	Pass	
2,4,6-Trichlorophenol	%	75			25-140	Pass	
2,6-Dichlorophenol	%	67			25-140	Pass	
4-Chloro-3-methylphenol	%	75			25-140	Pass	
Pentachlorophenol	%	51			25-140	Pass	
Tetrachlorophenols - Total	%	64			25-140	Pass	
LCS - % Recovery							
Phenols (non-Halogenated)							
2-Cyclohexyl-4,6-dinitrophenol	%	98			25-140	Pass	
2-Methyl-4,6-dinitrophenol	%	51			25-140	Pass	
2-Nitrophenol	%	70			25-140	Pass	
2,4-Dimethylphenol	%	75			25-140	Pass	
2,4-Dinitrophenol	%	61			25-140	Pass	
2-Methylphenol (o-Cresol)	%	61			25-140	Pass	
3&4-Methylphenol (m&p-Cresol)	%	55			25-140	Pass	
4-Nitrophenol	%	33			25-140	Pass	
Dinoseb	%	57			25-140	Pass	
Phenol	%	57			25-140	Pass	
LCS - % Recovery							
Ammonia (as N)	%	100			70-130	Pass	
Chloride	%	104			70-130	Pass	
Cyanide (total)	%	98			70-130	Pass	
Nitrate & Nitrite (as N)	%	102			70-130	Pass	
Phosphate total (as P)	%	99			70-130	Pass	
Sulphate (as SO4)	%	117			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	%	91			70-130	Pass	
LCS - % Recovery							
Alkalinity (speciated)							
Carbonate Alkalinity (as CaCO3)	%	102			70-130	Pass	
Total Alkalinity (as CaCO3)	%	110			70-130	Pass	
LCS - % Recovery							
Alkali Metals							
Calcium	%	98			80-120	Pass	
Magnesium	%	101			80-120	Pass	
Potassium	%	93			80-120	Pass	
Sodium	%	104			80-120	Pass	
LCS - % Recovery							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	%	97			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	108			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	118			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	123			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	95			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	100			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	102			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	125			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	115			50-150	Pass	
Perfluorotridecanoic acid (PFTTrDA)	%	126			50-150	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Perfluorotetradecanoic acid (PFTeDA)			%	57			50-150	Pass	
LCS - % Recovery									
Perfluoroalkyl sulfonamido substances									
Perfluorooctane sulfonamide (FOSA)			%	127			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)			%	97			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)			%	126			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)			%	117			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)			%	112			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)			%	112			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)			%	129			50-150	Pass	
LCS - % Recovery									
Perfluoroalkyl sulfonic acids (PFSAs)									
Perfluorobutanesulfonic acid (PFBS)			%	108			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)			%	57			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)			%	133			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)			%	112			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)			%	110			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)			%	107			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)			%	120			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)			%	72			50-150	Pass	
LCS - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA's)									
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)			%	124			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)			%	106			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)			%	138			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)			%	108			50-150	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons				Result 1					
TRH C10-C14	B21-De60447	NCP	%	97			70-130	Pass	
TRH >C10-C16	B21-De60447	NCP	%	100			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	N21-De50424	NCP	%	85			70-130	Pass	
Acenaphthylene	N21-De50424	NCP	%	104			70-130	Pass	
Benz(a)anthracene	N21-De50424	NCP	%	81			70-130	Pass	
Benzo(a)pyrene	N21-De50424	NCP	%	74			70-130	Pass	
Benzo(b&j)fluoranthene	N21-De50424	NCP	%	98			70-130	Pass	
Benzo(g,h,i)perylene	N21-De50424	NCP	%	111			70-130	Pass	
Benzo(k)fluoranthene	N21-De50424	NCP	%	75			70-130	Pass	
Chrysene	N21-De50424	NCP	%	109			70-130	Pass	
Dibenz(a,h)anthracene	N21-De50424	NCP	%	73			70-130	Pass	
Fluoranthene	N21-De50424	NCP	%	85			70-130	Pass	
Fluorene	N21-De50424	NCP	%	104			70-130	Pass	
Indeno(1.2.3-cd)pyrene	N21-De50424	NCP	%	100			70-130	Pass	
Naphthalene	N21-De50424	NCP	%	99			70-130	Pass	
Phenanthrene	N21-De50424	NCP	%	101			70-130	Pass	
Pyrene	N21-De50424	NCP	%	89			70-130	Pass	
Spike - % Recovery									
Phenols (Halogenated)				Result 1					
2-Chlorophenol	N21-De50424	NCP	%	74			30-130	Pass	
2,4-Dichlorophenol	N21-De50424	NCP	%	100			30-130	Pass	
2,4,5-Trichlorophenol	N21-De50424	NCP	%	66			30-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
2,4,6-Trichlorophenol	N21-De50424	NCP	%	87			30-130	Pass	
2,6-Dichlorophenol	N21-De50424	NCP	%	63			30-130	Pass	
4-Chloro-3-methylphenol	N21-De50424	NCP	%	101			30-130	Pass	
Pentachlorophenol	N21-De50424	NCP	%	120			30-130	Pass	
Tetrachlorophenols - Total	N21-De50424	NCP	%	122			30-130	Pass	
Spike - % Recovery									
Phenols (non-Halogenated)				Result 1					
2-Cyclohexyl-4,6-dinitrophenol	N21-De50424	NCP	%	109			30-130	Pass	
2-Methyl-4,6-dinitrophenol	N21-De50424	NCP	%	124			30-130	Pass	
2-Nitrophenol	N21-De50424	NCP	%	116			30-130	Pass	
2,4-Dinitrophenol	N21-De50424	NCP	%	71			30-130	Pass	
3&4-Methylphenol (m&p-Cresol)	N21-De50424	NCP	%	81			30-130	Pass	
4-Nitrophenol	M21-De46599	NCP	%	37			30-130	Pass	
Dinoseb	N21-De50424	NCP	%	126			30-130	Pass	
Phenol	M21-De46599	NCP	%	66			30-130	Pass	
Spike - % Recovery									
				Result 1					
Ammonia (as N)	M21-De51803	NCP	%	102			70-130	Pass	
Nitrate & Nitrite (as N)	M21-De51803	NCP	%	101			70-130	Pass	
Spike - % Recovery									
Alkali Metals				Result 1					
Calcium	B22-Ja01831	NCP	%	110			75-125	Pass	
Magnesium	B22-Ja01831	NCP	%	133			75-125	Fail	Q08
Potassium	B22-Ja01831	NCP	%	106			75-125	Pass	
Sodium	B22-Ja01831	NCP	%	112			75-125	Pass	
Spike - % Recovery									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1					
Perfluorobutanoic acid (PFBA)	M21-De51165	NCP	%	115			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	M21-De51165	NCP	%	69			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	M21-De51165	NCP	%	99			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	M21-De51165	NCP	%	88			50-150	Pass	
Perfluorooctanoic acid (PFOA)	M21-De51165	NCP	%	91			50-150	Pass	
Perfluorononanoic acid (PFNA)	M21-De51165	NCP	%	113			50-150	Pass	
Perfluorodecanoic acid (PFDA)	M21-De51165	NCP	%	107			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	M21-De51165	NCP	%	101			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	M21-De51165	NCP	%	106			50-150	Pass	
Perfluorotridecanoic acid (PFTeDA)	M21-De51165	NCP	%	145			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M21-De51165	NCP	%	98			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances				Result 1					
Perfluorooctane sulfonamide (FOSA)	M21-De51165	NCP	%	138			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M21-De51165	NCP	%	139			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M21-De51165	NCP	%	109			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	M21-De51165	NCP	%	127			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	M21-De51165	NCP	%	105			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M21-De51165	NCP	%	93			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M21-De51165	NCP	%	73			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFASs)				Result 1					
Perfluorobutanesulfonic acid (PFBS)	M21-De51165	NCP	%	142			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	M21-De51165	NCP	%	86			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M21-De51165	NCP	%	138			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M21-De51165	NCP	%	115			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M21-De51165	NCP	%	85			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M21-De51165	NCP	%	142			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	M21-De51165	NCP	%	112			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	M21-De58093	NCP	%	59			50-150	Pass	
Spike - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)				Result 1					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M21-De51165	NCP	%	137			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	M21-De51165	NCP	%	140			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M21-De51165	NCP	%	166			50-150	Fail	Q08
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M21-De51165	NCP	%	135			50-150	Pass	
Spike - % Recovery									
				Result 1					
Total Kjeldahl Nitrogen (as N)	B22-Ja02750	NCP	%	109			70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	N21-De50423	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Acenaphthylene	N21-De50423	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Anthracene	N21-De50423	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benz(a)anthracene	N21-De50423	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(a)pyrene	N21-De50423	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(b,j)fluoranthene	N21-De50423	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(g,h,i)perylene	N21-De50423	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(k)fluoranthene	N21-De50423	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Chrysene	N21-De50423	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Dibenz(a,h)anthracene	N21-De50423	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluoranthene	N21-De50423	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluorene	N21-De50423	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Indeno(1,2,3-cd)pyrene	N21-De50423	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Naphthalene	N21-De50423	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Phenanthrene	N21-De50423	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Pyrene	N21-De50423	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	

Duplicate								
Polychlorinated Biphenyls				Result 1	Result 2	RPD		
Aroclor-1016	M21-De50055	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Aroclor-1221	M21-De50055	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Aroclor-1232	M21-De50055	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Aroclor-1242	M21-De50055	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Aroclor-1248	M21-De50055	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Aroclor-1254	M21-De50055	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Aroclor-1260	M21-De50055	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Total PCB*	M21-De50055	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Duplicate								
Phenols (Halogenated)				Result 1	Result 2	RPD		
2-Chlorophenol	N21-De50423	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass
2,4-Dichlorophenol	N21-De50423	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass
2,4,5-Trichlorophenol	N21-De50423	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass
2,4,6-Trichlorophenol	N21-De50423	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass
2,6-Dichlorophenol	N21-De50435	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass
4-Chloro-3-methylphenol	N21-De50423	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass
Pentachlorophenol	N21-De50423	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass
Tetrachlorophenols - Total	N21-De50423	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass
Duplicate								
Phenols (non-Halogenated)				Result 1	Result 2	RPD		
2-Cyclohexyl-4,6-dinitrophenol	N21-De50423	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass
2-Methyl-4,6-dinitrophenol	N21-De50423	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass
2-Nitrophenol	N21-De50423	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass
2,4-Dimethylphenol	N21-De50423	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass
2,4-Dinitrophenol	N21-De50423	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass
2-Methylphenol (o-Cresol)	N21-De50423	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass
3&4-Methylphenol (m&p-Cresol)	N21-De50423	NCP	mg/L	< 0.006	< 0.006	<1	30%	Pass
4-Nitrophenol	N21-De50423	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass
Dinoseb	N21-De50423	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass
Phenol	N21-De50423	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Ammonia (as N)	M21-De51165	NCP	mg/L	0.35	0.36	2.0	30%	Pass
Chloride	M21-De51147	CP	mg/L	45	45	1.0	30%	Pass
Cyanide (total)	M21-De54246	NCP	mg/L	0.027	0.017	44	30%	Fail Q15
Nitrate & Nitrite (as N)	M21-De51165	NCP	mg/L	15	15	<1	30%	Pass
Phosphate total (as P)	M21-De55394	NCP	mg/L	0.03	< 0.01	93	30%	Fail Q15
Sulphate (as SO ₄)	N21-De50426	NCP	mg/L	2700	2800	6.0	30%	Pass
Total Kjeldahl Nitrogen (as N)	L21-De47765	NCP	mg/L	0.7	0.5	41	30%	Fail Q15
Duplicate								
Alkalinity (speciated)				Result 1	Result 2	RPD		
Bicarbonate Alkalinity (as CaCO ₃)	B21-De60062	NCP	mg/L	180	200	10	30%	Pass
Carbonate Alkalinity (as CaCO ₃)	N21-De50428	NCP	mg/L	< 10	< 10	<1	30%	Pass
Hydroxide Alkalinity (as CaCO ₃)	B21-De60062	NCP	mg/L	< 20	< 20	<1	30%	Pass
Total Alkalinity (as CaCO ₃)	B21-De60062	NCP	mg/L	190	200	7.0	30%	Pass
Duplicate								
Alkali Metals				Result 1	Result 2	RPD		
Calcium	B22-Ja01831	NCP	mg/L	5.2	6.3	19	30%	Pass
Magnesium	B22-Ja01831	NCP	mg/L	250	290	13	30%	Pass
Potassium	B22-Ja01831	NCP	mg/L	5.7	6.1	7.0	30%	Pass
Sodium	B22-Ja01831	NCP	mg/L	60	64	6.0	30%	Pass

Duplicate								
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1	Result 2	RPD		
Perfluorobutanoic acid (PFBA)	M21-De50243	NCP	ug/L	0.07	0.07	3.0	30%	Pass
Perfluoropentanoic acid (PFPeA)	M21-De50243	NCP	ug/L	0.02	0.02	3.0	30%	Pass
Perfluorohexanoic acid (PFHxA)	M21-De50243	NCP	ug/L	0.02	0.02	1.0	30%	Pass
Perfluoroheptanoic acid (PFHpA)	M21-De50243	NCP	ug/L	0.01	0.01	3.0	30%	Pass
Perfluorooctanoic acid (PFOA)	M21-De50243	NCP	ug/L	0.02	0.02	12	30%	Pass
Perfluorononanoic acid (PFNA)	M21-De50243	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorodecanoic acid (PFDA)	M21-De50243	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoroundecanoic acid (PFUnDA)	M21-De50243	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorododecanoic acid (PFDoDA)	M21-De50243	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorotridecanoic acid (PFTrDA)	M21-De50243	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorotetradecanoic acid (PFTeDA)	M21-De50243	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Duplicate								
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD		
Perfluorooctane sulfonamide (FOSA)	M21-De50243	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M21-De50243	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M21-De50243	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	M21-De50243	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	M21-De50243	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M21-De50243	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M21-De50243	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
Duplicate								
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1	Result 2	RPD		
Perfluorobutanesulfonic acid (PFBS)	M21-De50243	NCP	ug/L	0.02	0.02	18	30%	Pass
Perfluorononanesulfonic acid (PFNS)	M21-De50243	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropropanesulfonic acid (PFPrS)	M21-De50243	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropentanesulfonic acid (PFPeS)	M21-De50243	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorohexanesulfonic acid (PFHxS)	M21-De50243	NCP	ug/L	0.06	0.06	4.0	30%	Pass
Perfluoroheptanesulfonic acid (PFHpS)	M21-De50243	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorooctanesulfonic acid (PFOS)	M21-De50243	NCP	ug/L	0.10	0.09	9.0	30%	Pass
Perfluorodecanesulfonic acid (PFDS)	M21-De50243	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Duplicate								
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)				Result 1	Result 2	RPD		
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M21-De50243	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	M21-De50243	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M21-De50243	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M21-De50243	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).
Q08	The matrix spike recovery is outside of the recommended acceptance criteria. An acceptable recovery was obtained for the laboratory control sample indicating a sample matrix interference.
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

Michael Morrison	Analytical Services Manager
Vivian Wang	Senior Analyst-Volatile (VIC)
Scott Beddoes	Senior Analyst-Inorganic (VIC)
Joseph Edouard	Senior Analyst-Organic (VIC)
Emily Rosenberg	Senior Analyst-Metal (VIC)
Joseph Edouard	Senior Analyst-PFAS (VIC)



Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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RE: [EXT]:Eurofins Sample Receipt Advice - Report 852254 : Site GROUNDWATER MONITORING (J174436)

Varun Bhagwat <Varun.Bhagwat@greencap.com.au>

Thu 23/12/2021 12:58 PM

To: #AU_CAU001_EnviroSampleVic <EnviroSampleVic@eurofins.com>; Michael Morrison <MichaelMorrison@eurofins.com>

Cc: #AU09_EnviroSampleDRW <EnviroSampleDRW@eurofins.com>

EXTERNAL EMAIL*

Hi Michael,

Thanks for sending that through.

I'm meant to have sent 4 x 40ml glass vials for glycol analysis to the ALS labs but I might have accidentally mixed them up and sent to the Eurofins lab.

Can you please check if you have these vials?

There should be two for sample EMB13 and two for EMB14. The vials should be the ALS ones for glycol analysis.

Please let me know if you are able to locate them.

Thank you.

Cheers,

Varun Bhagwat

Environmental Consultant | Greencap

Unit 11 / 14 Winnellie Road Winnellie, NT 0820

M: 0428 829 444 | E: Varun.Bhagwat@greencap.com.au | in: [LinkedIn](#)**GREENCAP**

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Environmental Division
Melbourne

Work Order Reference

EM2126049

greencap offices will be closed from **Fri 24 Dec 2021** returning **Mon 10 Jan 2022**
click here for **Emergency Contacts** for urgent works during this period



Telephone : +61 8 8549 9600

Handwritten signature

Received:

C/note:

Temp:

Ice / Icebricks / NA

Carrier:



QUALITY CONTROL REPORT

Work Order	: EM2126049	Page	: 1 of 3
Client	: GRENCAP-NAA PTY LTD	Laboratory	: Environmental Division Melbourne
Contact	: VARUN BHAGWAT	Contact	: Peter Ravlic
Address	: 11/14 Winnellie Road WINNELLIE NT, AUSTRALIA 0820	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9645
Project	: J174436	Date Samples Received	: 29-Dec-2021
Order number	: ----	Date Analysis Commenced	: 30-Dec-2021
C-O-C number	: ----	Issue Date	: 31-Dec-2021
Sampler	: ----		
Site	: GROUNDWATER MONITORING		
Quote number	: EN/222		
No. of samples received	: 2		
No. of samples analysed	: 2		



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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

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>
Xing Lin	Senior Organic Chemist	Melbourne Organics, Springvale, VIC



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.

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 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
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP067: Glycols (QC Lot: 4102855)									
EM2126049-001	EMB13	EP067: 2-Ethoxyethyl acetate	111-15-9	2	mg/L	<2	<2	0.0	No Limit
		EP067: 2-Butoxyethanol	111-76-2	2	mg/L	<2	<2	0.0	No Limit
		EP067: Propylene glycol	57-55-6	2	mg/L	<2	<2	0.0	No Limit
		EP067: Ethylene glycol	107-21-1	2	mg/L	<2	<2	0.0	No Limit
		EP067: Diethylene glycol monobutyl ether	112-34-5	2	mg/L	<2	<2	0.0	No Limit
		EP067: Diethylene glycol	111-46-6	2	mg/L	<2	<2	0.0	No Limit
		EP067: Triethylene glycol	112-27-6	2	mg/L	<2	<2	0.0	No Limit



Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP067: Glycols (QCLot: 4102855)								
EP067: 2-Ethoxyethyl acetate	111-15-9	2	mg/L	<2	100 mg/L	# 140	60.3	134
EP067: 2-Butoxyethanol	111-76-2	2	mg/L	<2	100 mg/L	125	61.6	140
EP067: Propylene glycol	57-55-6	2	mg/L	<2	100 mg/L	121	77.9	132
EP067: Ethylene glycol	107-21-1	2	mg/L	<2	100 mg/L	125	74.7	136
EP067: Diethylene glycol monobutyl ether	112-34-5	2	mg/L	<2	100 mg/L	125	73.4	136
EP067: Diethylene glycol	111-46-6	2	mg/L	<2	100 mg/L	115	74.4	138
EP067: Triethylene glycol	112-27-6	2	mg/L	<2	100 mg/L	106	69.0	142

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number		MS	Low	High
EP067: Glycols (QCLot: 4102855)							
EM2126049-002	EMB14	EP067: 2-Ethoxyethyl acetate	111-15-9	100 mg/L	130	37.5	146
		EP067: 2-Butoxyethanol	111-76-2	100 mg/L	116	43.6	151
		EP067: Propylene glycol	57-55-6	100 mg/L	122	69.4	137
		EP067: Ethylene glycol	107-21-1	100 mg/L	127	59.9	140
		EP067: Diethylene glycol monobutyl ether	112-34-5	100 mg/L	120	56.8	147
		EP067: Diethylene glycol	111-46-6	100 mg/L	132	46.9	150
		EP067: Triethylene glycol	112-27-6	100 mg/L	134	32.2	156

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EM2126049	Page	: 1 of 4
Client	: GREENCAP-NAA PTY LTD	Laboratory	: Environmental Division Melbourne
Contact	: VARUN BHAGWAT	Telephone	: +6138549 9645
Project	: J174436	Date Samples Received	: 29-Dec-2021
Site	: GROUNDWATER MONITORING	Issue Date	: 31-Dec-2021
Sampler	: ----	No. of samples received	: 2
Order number	: ----	No. of samples analysed	: 2

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Matrix Spike outliers occur.
- Laboratory Control outliers exist - please see following pages for full details.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- **NO** Quality Control Sample Frequency Outliers exist.

Page : 2 of 4
 Work Order : EM2126049
 Client : GREENCAP-NAA PTY LTD
 Project : J174436



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EP067: Glycols	QC-4102855-001	----	2-Ethoxyethyl acetate	111-15-9	140 %	60.3-134%	Recovery greater than upper control limit

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method		Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EP067: Glycols							
VOC Vial - unpreserved							
EMB13,	EMB14	30-Dec-2021	24-Dec-2021	6	30-Dec-2021	24-Dec-2021	6

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP067: Glycols								
VOC Vial - unpreserved (EP067)								
EMB13,	EMB14	17-Dec-2021	30-Dec-2021	24-Dec-2021	✖	30-Dec-2021	24-Dec-2021	✖



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Glycols by GCMS	EP067	1	2	50.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Glycols by GCMS	EP067	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Glycols by GCMS	EP067	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Glycols by GCMS	EP067	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Glycols by GCMS	EP067	WATER	In house method for the analysis of Glycols in water by GCMS
Preparation Methods	Method	Matrix	Method Descriptions
Sample Preparation for Glycols in water analysis	EP067-PR	WATER	In house. Samples are pre-filtered and diluted 1:1 with methanol. Internal standards are added prior to analysis.

CERTIFICATE OF ANALYSIS

Work Order : **EM2126049**
Client : **GREENCAP-NAA PTY LTD**
Contact : **VARUN BHAGWAT**
Address : **11/14 Winnellie Road**
WINNELLIE NT, AUSTRALIA 0820
Telephone : **----**
Project : **J174436**
Order number : **----**
C-O-C number : **----**
Sampler : **----**
Site : **GROUNDWATER MONITORING**
Quote number : **EN/222**
No. of samples received : **2**
No. of samples analysed : **2**

Page : 1 of 2
Laboratory : Environmental Division Melbourne
Contact : Peter Ravlic
Address : 4 Westall Rd Springvale VIC Australia 3171
Telephone : +6138549 9645
Date Samples Received : 29-Dec-2021 14:10
Date Analysis Commenced : 30-Dec-2021
Issue Date : 31-Dec-2021 11:52



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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Xing Lin	Senior Organic Chemist	Melbourne Organics, Springvale, VIC



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.

- No standard reference exists for the Holding Time of Glycols in waters. ALS takes a conservative approach and applies a holding time of 7 days for analysis.

Analytical Results

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

Sample ID

				EMB13	EMB14	----	----	----
Sampling date / time				17-Dec-2021 00:00	17-Dec-2021 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EM2126049-001	EM2126049-002	-----	-----	-----
				Result	Result	----	----	----
EP067: Glycols								
2-Ethoxyethyl acetate	111-15-9	2	mg/L	<2	<2	----	----	----
2-Butoxyethanol	111-76-2	2	mg/L	<2	<2	----	----	----
Propylene glycol	57-55-6	2	mg/L	<2	<2	----	----	----
Ethylene glycol	107-21-1	2	mg/L	<2	<2	----	----	----
Diethylene glycol monobutyl ether	112-34-5	2	mg/L	<2	<2	----	----	----
Diethylene glycol	111-46-6	2	mg/L	<2	<2	----	----	----
Triethylene glycol	112-27-6	2	mg/L	<2	<2	----	----	----

Kim - ALS
21-12-21
7:30am

LAB OF C. J. DARWIN



1 of 1

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : ES2146552

Client : GRENCAP-NAA PTY LTD Contact : VARUN BHAGWAT Address : 11/14 Winnellie Road WINNELLIE NT, AUSTRALIA 0820 E-mail : varun.bhagwat@grencap.com.au Telephone : ---- Facsimile : ---- Project : J174436 Groundwater Monitoring Order number : PO296186 C-O-C number : ---- Site : 800 Berrimah Rd, East Arm Sampler : VARUN BHAGWAT	Laboratory : Environmental Division Sydney Contact : Peter Ravlic Address : 277-289 Woodpark Road Smithfield NSW Australia 2164 E-mail : peter.ravlic@alsglobal.com Telephone : +6138549 9645 Facsimile : +61-2-8784 8500 Page : 1 of 2 Quote number : EM2018ADEENV0002 (EN/333 - secondary work only) QC Level : NEPM 2013 B3 & ALS QC Standard

Dates

Date Samples Received : 21-Dec-2021 07:30 Client Requested Due : 05-Jan-2022 Date	Issue Date : 21-Dec-2021 Scheduled Reporting Date : 05-Jan-2022

Delivery Details

Mode of Delivery : Client Drop Off No. of coolers/boxes : ---- Receipt Detail :	Security Seal : Not Available Temperature : 0.1° C No. of samples received / analysed : 3 / 3

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- **The analysis for the samples will be conducted as bottles provided.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- ### Summary of Sample(s) and Requested Analysis

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Laboratory sample ID	Sampling date / time	Sample ID	WATER Dissolve	WATER TRH(C6)
ES2146552-001	17-Dec-2021 00:00	EMB13	✓	
ES2146552-002	17-Dec-2021 00:00	EMB14	✓	
ES2146552-003	17-Dec-2021 00:00	QC01A		✓

Sample(s) have been received within the recommended holding times for the requested analysis.

Email ap@greencap.com.au

Email varun.bhagwat@greencap.com.au

- Email varun.bhagwat@greencap.com.au
Email varun.bhagwat@greencap.com.au
Email varun.bhagwat@greencap.com.au
Email varun.bhagwat@greencap.com.au
Email varun.bhagwat@greencap.com.au
Email varun.bhagwat@greencap.com.au

QUALITY CONTROL REPORT

Work Order : **ES2146552**

Page : 1 of 6

Amendment : **1**

Client : **GREENCAP-NAA PTY LTD**
 Contact : **VARUN BHAGWAT**
 Address : 11/14 Winnellie Road
 WINNELLIE NT, AUSTRALIA 0820
 Telephone : ----
 Project : J174436 Groundwater Monitoring
 Order number : PO296186
 C-O-C number : ----
 Sampler : **VARUN BHAGWAT**
 Site : 800 Berrimah Rd, East Arm
 Quote number : EN/333 - secondary work only
 No. of samples received : 3
 No. of samples analysed : 3

Laboratory : Environmental Division Sydney
 Contact : Peter Ravlic
 Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
 Telephone : +6138549 9645
 Date Samples Received : 21-Dec-2021
 Date Analysis Commenced : 24-Dec-2021
 Issue Date : 18-Jan-2022



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- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

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

Signatories	Position	Accreditation Category
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW



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Key :
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Laboratory Duplicate (DUP) Report

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Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 4100665)									
ES2146683-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.004	0.004	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.006	0.006	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.027	0.027	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.0	No Limit
ES2146700-008	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	0.209	0.208	0.3	0% - 20%
		EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.006	0.006	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	0.012	0.010	18.0	0% - 50%



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 4100665) - continued									
ES2146700-008	Anonymous	EG020A-F: Manganese	7439-96-5	0.001	mg/L	13.3	13.0	2.3	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.029	0.028	4.5	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	32.7	31.9	2.4	0% - 20%
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	1.52	1.41	8.1	0% - 20%
EG035F: Dissolved Mercury by FIMS (QC Lot: 4122078)									
ES2200815-002	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2200868-022	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4100870)									
ES2146547-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES2146547-011	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4100870)									
ES2146547-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES2146547-011	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 4100870)									
ES2146547-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
ES2146547-011	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit



Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EG020F: Dissolved Metals by ICP-MS (QCLot: 4100665)								
EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	0.02 mg/L	101	70.0	130
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	92.8	85.0	114
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	106	85.0	115
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	97.9	82.0	110
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	93.8	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	92.5	85.0	111
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	90.1	82.0	112
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	89.1	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	92.7	83.0	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	88.2	82.0	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	91.2	82.0	112
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	94.4	85.0	115
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	93.4	83.0	109
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	84.1	81.0	117
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.5 mg/L	110	85.0	115
EG035F: Dissolved Mercury by FIMS (QCLot: 4122078)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	100	83.0	105
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4098526)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	68.9	55.8	112
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	87.4	71.6	113
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	77.2	56.0	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4100870)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	93.1	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4098526)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	71.1	57.9	119
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	73.3	62.5	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	95.9	61.5	121
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4100870)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	97.7	75.0	127
EP080: BTEXN (QCLot: 4100870)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	95.9	70.0	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	91.9	69.0	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	82.4	70.0	120



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	Low	High
EP080: BTEXN (QCLot: 4100870) - continued								
EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	10 µg/L	81.1	69.0	121
	106-42-3							
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	83.1	72.0	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	91.5	70.0	120

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 4100665)							
ES2146552-002	EMB14	EG020A-F: Arsenic	7440-38-2	1 mg/L	96.1	70.0	130
		EG020A-F: Beryllium	7440-41-7	1 mg/L	109	70.0	130
		EG020A-F: Barium	7440-39-3	1 mg/L	102	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	99.2	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	97.6	70.0	130
		EG020A-F: Cobalt	7440-48-4	1 mg/L	93.9	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	95.6	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	97.2	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	92.5	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	94.6	70.0	130
		EG020A-F: Vanadium	7440-62-2	1 mg/L	97.3	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	88.2	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 4122078)							
ES2200815-001	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	94.5	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4100870)							
ES2146547-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	98.9	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4100870)							
ES2146547-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	94.1	70.0	130
EP080: BTEXN (QCLot: 4100870)							
ES2146547-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	93.1	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	95.8	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	97.5	70.0	130
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	99.2	70.0	130
			106-42-3				
		EP080: ortho-Xylene	95-47-6	25 µg/L	102	70.0	130



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080: BTEXN (QCLot: 4100870) - continued							
ES2146547-001	Anonymous	EP080: Naphthalene	91-20-3	25 µg/L	97.9	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES2146552	Page	: 1 of 5
Amendment	: 1		
Client	: GREENCAP-NAA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: VARUN BHAGWAT	Telephone	: +6138549 9645
Project	: J174436 Groundwater Monitoring	Date Samples Received	: 21-Dec-2021
Site	: 800 Berrimah Rd, East Arm	Issue Date	: 18-Jan-2022
Sampler	: VARUN BHAGWAT	No. of samples received	: 3
Order number	: PO296186	No. of samples analysed	: 3

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- **NO** Matrix Spike outliers occur.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.



Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EG035F: Dissolved Mercury by FIMS						
Clear HDPE (U-T ORC) - Filtered; Lab-acidified EMB14	----	----	----	17-Jan-2022	14-Jan-2022	3
Clear Plastic Bottle - Filtered; Lab-acidified EMB13	----	----	----	17-Jan-2022	14-Jan-2022	3

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
TRH - Semivolatile Fraction	0	7	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
TRH - Semivolatile Fraction	0	7	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020A-F) EMB14	17-Dec-2021	----	----	----	29-Dec-2021	15-Jun-2022	✔
Clear Plastic Bottle - Filtered; Lab-acidified (EG020A-F) EMB13	17-Dec-2021	----	----	----	29-Dec-2021	15-Jun-2022	✔
EG035F: Dissolved Mercury by FIMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG035F) EMB14	17-Dec-2021	----	----	----	17-Jan-2022	14-Jan-2022	✘
Clear Plastic Bottle - Filtered; Lab-acidified (EG035F) EMB13	17-Dec-2021	----	----	----	17-Jan-2022	14-Jan-2022	✘

Page : 3 of 5
 Work Order : ES2146552 Amendment 1
 Client : GREENCAP-NAA PTY LTD
 Project : J174436 Groundwater Monitoring



Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071) QC01A	17-Dec-2021	24-Dec-2021	24-Dec-2021	✓	31-Dec-2021	02-Feb-2022	✓
Clear glass VOC vial - HCl (EP080) QC01A	17-Dec-2021	30-Dec-2021	31-Dec-2021	✓	30-Dec-2021	31-Dec-2021	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071) QC01A	17-Dec-2021	24-Dec-2021	24-Dec-2021	✓	31-Dec-2021	02-Feb-2022	✓
Clear glass VOC vial - HCl (EP080) QC01A	17-Dec-2021	30-Dec-2021	31-Dec-2021	✓	30-Dec-2021	31-Dec-2021	✓
EP080: BTEXN							
Clear glass VOC vial - HCl (EP080) QC01A	17-Dec-2021	30-Dec-2021	31-Dec-2021	✓	30-Dec-2021	31-Dec-2021	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification	
Analytical Methods	Method	QC	Regular	Actual	Expected		Evaluation
Laboratory Duplicates (DUP)							
Dissolved Mercury by FIMS	EG035F	2	16	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	7	0.00	10.00	✗	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Dissolved Mercury by FIMS	EG035F	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	7	14.29	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Dissolved Mercury by FIMS	EG035F	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	7	14.29	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Dissolved Mercury by FIMS	EG035F	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	7	0.00	5.00	✗	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015 The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260 Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM Schedule B(3)
Preparation Methods	Method	Matrix	Method Descriptions
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for purging.

CERTIFICATE OF ANALYSIS

Work Order	: ES2146552	Page	: 1 of 5
Amendment	: 1		
Client	: GRENCAP-NAA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: VARUN BHAGWAT	Contact	: Peter Ravlic
Address	: 11/14 Winnellie Road	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
	WINNELLIE NT, AUSTRALIA 0820		
Telephone	: ----	Telephone	: +6138549 9645
Project	: J174436 Groundwater Monitoring	Date Samples Received	: 21-Dec-2021 07:30
Order number	: PO296186	Date Analysis Commenced	: 24-Dec-2021
C-O-C number	: ----	Issue Date	: 18-Jan-2022 10:18
Sampler	: VARUN BHAGWAT		
Site	: 800 Berrimah Rd, East Arm		
Quote number	: EN/333 - secondary work only		
No. of samples received	: 3		
No. of samples analysed	: 3		



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, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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>
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW



General Comments

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

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

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

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

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

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

- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- Amendment (14/01/2022): This report has been amended and re-released to allow the reporting of additional analytical data, W-3: 15 metals for samples EMB13 and EMB14 (ALS #1 & #2).

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	EMB13	EMB14	QC01A	----	----
Sampling date / time				17-Dec-2021 00:00	17-Dec-2021 00:00	17-Dec-2021 00:00	----	----	
Compound	CAS Number	LOR	Unit	ES2146552-001	ES2146552-002	ES2146552-003	-----	-----	
				Result	Result	Result	----	----	
EG020F: Dissolved Metals by ICP-MS									
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	----	----	----	
Arsenic	7440-38-2	0.001	mg/L	0.001	<0.001	----	----	----	
Boron	7440-42-8	0.05	mg/L	0.05	<0.05	----	----	----	
Barium	7440-39-3	0.001	mg/L	0.050	0.363	----	----	----	
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	----	----	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	----	----	----	
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	----	----	----	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	----	----	----	
Copper	7440-50-8	0.001	mg/L	0.003	0.004	----	----	----	
Manganese	7439-96-5	0.001	mg/L	0.029	0.003	----	----	----	
Nickel	7440-02-0	0.001	mg/L	0.001	0.001	----	----	----	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	----	----	----	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	----	----	----	
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	----	----	----	
Zinc	7440-66-6	0.005	mg/L	0.030	0.799	----	----	----	
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	----	----	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	----	----	<20	----	----	
C10 - C14 Fraction	----	50	µg/L	----	----	<50	----	----	
C15 - C28 Fraction	----	100	µg/L	----	----	<100	----	----	
C29 - C36 Fraction	----	50	µg/L	----	----	<50	----	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	----	----	<50	----	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	----	----	<20	----	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	----	----	<20	----	----	
>C10 - C16 Fraction	----	100	µg/L	----	----	<100	----	----	
>C16 - C34 Fraction	----	100	µg/L	----	----	<100	----	----	
>C34 - C40 Fraction	----	100	µg/L	----	----	<100	----	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	----	----	<100	----	----	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	----	----	<100	----	----	
EP080: BTEXN									



Analytical Results

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

Sample ID

				EMB13	EMB14	QC01A	----	----
Sampling date / time				17-Dec-2021 00:00	17-Dec-2021 00:00	17-Dec-2021 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2146552-001	ES2146552-002	ES2146552-003	-----	-----
				Result	Result	Result	----	----
EP080: BTEXN - Continued								
Benzene	71-43-2	1	µg/L	----	----	<1	----	----
Toluene	108-88-3	2	µg/L	----	----	<2	----	----
Ethylbenzene	100-41-4	2	µg/L	----	----	<2	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	----	----	<2	----	----
ortho-Xylene	95-47-6	2	µg/L	----	----	<2	----	----
^ Total Xylenes	----	2	µg/L	----	----	<2	----	----
^ Sum of BTEX	----	1	µg/L	----	----	<1	----	----
Naphthalene	91-20-3	5	µg/L	----	----	<5	----	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	----	----	115	----	----
Toluene-D8	2037-26-5	2	%	----	----	104	----	----
4-Bromofluorobenzene	460-00-4	2	%	----	----	98.9	----	----



Surrogate Control Limits

Sub-Matrix: **WATER**

		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128



24 January 2022

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George Hatzimihalis
Technical Director
Global Resource Recovery
Vopak Terminal, East Arm
Northern Territory 0822

RE: GLOBAL RESOURCE RECOVERY – MONTHLY GROUNDWATER MONITORING EVENT (JANUARY 2022)

1.0 Introduction

Greencap Pty Ltd (Greencap) was commissioned by Global Resource Recovery (GRR) to implement a groundwater monitoring program, inclusive of monthly, quarterly and annual monitoring events at the Vopak Terminal located at East Arm, Northern Territory (the Site).

Greencap has previously undertaken monthly groundwater monitoring at the Site in accordance with Attachment B of the Environment Protection Licence (EPL) 229-01.

This report details the results of the January 2022 monthly monitoring event.

2.0 Groundwater Monthly Monitoring Event – January 2022

The monthly monitoring event included:

- gauging of water levels in all five monitoring bores.
- measurement of field parameters in two monitoring bores.

2.1 Methodology

Greencap conducted a monitoring event on 21 January 2021 involving the gauging of five monitoring bores (EMB7, EMB12, EMB13, EMB14 and EMB15) and the measurement of field parameters in two monitoring bores (EMB13 and EMB14).

The following methodology was applied:

- Measuring standing water levels (SWL) from the surveyed point at the top of the casings using water/product interface water level meter prior to sampling.
- Monitoring physio-chemical parameters (pH, temperature, dissolved oxygen, electrical conductivity, salinity, total dissolved solids, turbidity and oxidation-reduction potential) during purging using a calibrated water quality meter. A low flow peristaltic pump with monitoring bore-specific dedicated tubing was used to draw groundwater from the monitoring bores. Field parameters were recorded once they were deemed to have stabilised. Field observations were recorded during sampling including aesthetic evidence of contamination such as sheen, colour and odour.

2.2 Results

The recorded SWLs and measured field parameters are presented in Table 1 and Table 2 respectively.

Table 1 – January 2022 Groundwater Levels

Well ID	Date	SWL			Depth of Bore (m)
		mBTOC	mBGL	mAHD	
EMB7	21/01/2021	1.038	1.038	5.387	9.237
EMB12	21/01/2021	1.121	1.121	5.379	9.325
EMB13	21/01/2021	2.283	1.483	6.553	10.245
EMB14	21/01/2021	1.709	1.009	7.546	9.803
EMB15	21/01/2021	0.678	0.678	5.976	9.314

mBTOC – metres below top of casing

mBGL – metres below ground level

mAHD – metres Australian Height Datum

Table 2 – January 2022 Field Parameters

Well ID	pH	Temperature (°C)	Dissolved Oxygen (% saturation)	Electrical Conductivity (µS/cm)	Salinity (PSU)	Total Dissolved Solids (mg/L)	Turbidity (NTU)	ORP (mV)
EMB13	3.9	33.0	7.9	256.1	0.12	168	4.95	58.3
EMB14	6.3	34.1	52	193.7	0.09	125	6.13	29.6

Field records are presented in Attachment 2.

The next groundwater monitoring event is scheduled to occur in February 2022.

Attachments

- 1 Statements of Limitation
- 2 Field Record Sheets

Yours Sincerely,



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Groundwater Monitoring Event – January 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 1: Statements of Limitation

Statements of Limitation

All and any Services proposed by Greencap to the Client were subject to the Terms and Conditions listed on the Greencap website at: <https://www.greencap.com.au/terms-conditions> Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap does not agree to any alternative terms or variation of these terms if subsequently proposed by the Client. The Services were carried out in accordance with the current and relevant industry standards of testing, interpretation and analysis. The Services were carried out in accordance with Commonwealth, State, Territory or Government legislation, regulations and/or guidelines. The Client was deemed to have accepted these Terms when the Client signed the Proposal (where indicated) or when the Company commenced the Services at the request (written or otherwise) of the Client.

The services were carried out for the Specific Purpose, outlined in the body of the Proposal. To the fullest extent permitted by law, Greencap, its related bodies corporate, its officers, consultants, employees and agents assume no liability, and will not be liable to any person, or in relation to, any losses, damages, costs or expenses, and whether arising in contract, tort including negligence, under statute, in equity or otherwise, arising out of, or in connection with, any matter outside the Specific Purpose.

The Client acknowledged and agreed that proposed investigations were to rely on information provided to Greencap by the Client or other third parties. Greencap made no representation or warranty regarding the completeness or accuracy of any descriptions or conclusions based on information supplied to it by the Client, its employees or other third parties during provision of the Services. Under no circumstances shall Greencap have any liability for, or in relation to, any work, reports, information, plans, designs, or specifications supplied or prepared by any third party, including any third party recommended by Greencap. The Client releases and indemnifies Greencap from and against all Claims arising from errors, omissions or inaccuracies in documents or other information provided to Greencap by the Client, its employees or other third parties.

The Client was to ensure that Greencap had access to all information, sites and buildings as required by or necessary for Greencap to undertake the Services. Notwithstanding any other provision in these Terms, Greencap will have no liability to the Client or any third party to the extent that the performance of the Services was not able to be undertaken (in whole or in part) due to access to any relevant sites or buildings being prevented or delayed due to the Client or their respective employees or contractors expressing safety or health concerns associated with such access.

Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap, its related bodies corporate, its officers, employees and agents assume no liability and will not be liable for lost profit, revenue, production, contract, opportunity, loss arising from business interruption or delay, indirect or consequential loss or loss to the extent caused or contributed to by the Client or third parties, suffered or incurred arising out of or in connection with our Proposals, Reports, the Project or the Agreement. In the event Greencap is found by a Court or Tribunal to be liable to the Client for any loss or damage arising in connection with the Services, the Client's entitlement to recover damages from Greencap shall be reduced by such amount as reflects the extent to which any act, default, omission or negligence of the Client, or any third party, caused or contributed to such loss or damage. Unless otherwise agreed in writing and signed by both parties, Greencap's total aggregate liability will not exceed the total consulting fees paid by the client in relation to this Proposal. For further detail, see Greencap's Terms and Conditions available at <https://www.greencap.com.au/terms-conditions>

The Report is provided for the exclusive use of the Client and for this Project only, in accordance with the Scope and Specific Purpose as outlined in the Agreement, and only those third parties who have been authorized in writing by Greencap. It should not be used for other purposes, other projects or by a third party unless otherwise agreed and authorized in writing by Greencap. Any person relying upon this Report beyond its exclusive use and Specific Purpose, and without the express written consent of Greencap, does so entirely at their own risk and without recourse to Greencap for any loss, liability or damage. To the extent permitted by law, Greencap assumes no responsibility for any loss, liability, damage, costs or expenses arising from interpretations or conclusions made by others, or use of the Report by a third party. Except as specifically agreed by Greencap in writing, it does not authorize the use of this Report by any third party. It is the responsibility of third parties to independently make inquiries or seek advice in relation to their particular requirements and proposed use of the site.

The conclusions, or data referred to in this Report, should not be used as part of a specification for a project without review and written agreement by Greencap. This Report has been written as advice and opinion, rather than with the purpose of specifying instructions for design or redevelopment. Greencap does not purport to recommend or induce a decision to make (or not make) any purchase, disposal, investment, divestment, financial commitment or otherwise in relation to the site it investigated.

This Report should be read in whole and should not be copied in part or altered. The Report as a whole set outs the findings of the investigations. No responsibility is accepted by Greencap for use of parts of the Report in the absence (or out of context) of the balance of the Report.



Groundwater Monitoring Event – January 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 2: Field Record Sheets

Groundwater Sampling Record

Client: <u>GRR</u>		Job No: <u>J174436</u>		Well ID: <u>EMB13</u>	
Project: <u>GME</u>		Sampled by: <u>VB</u>			
Location: <u>GRR & Vopak Site East Arm, NT</u>		Date: <u>21/1/22</u>			

WELL DETAILS		SAMPLING EQUIPMENT				*Other Sampling Equipment / Method
Well depth: <u>10.245</u> (m)	Device: <u>micropurge</u> <u>peristaltic</u> footvalve bailer					
Casing diameter: <u>50</u> (mm)	Method: <u>low-flow</u> 4-well-volume purged dry					
Casing type: <u>PVC</u> / steel / other	WQM Make: <u>YSI</u>					
Depth to product (m bTOC)	WL Meter: <u>interface</u> non-interface					
Depth to water: <u>2.283</u> (m bTOC)	Screen (from - to), m <u>7.245 - 10.245</u>					
Product thickness (m)	Pump Depth (m bTOC)					

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
OVERCAST / CLOUDY / PARTLY SUNNY

Purging instructions:
Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre; 100mm (4") diameter - 8 L/metre; 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment Turbidity, Colour, Odour, Sheen, etc
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond <u>µS/cm</u> / mS/cm	ORP mV	DO mg/L / ppm / %	
1200	1NT	3.078	33.0	4.96	279.2	70.6	21.1	0.13 183.30
1204	2	4.066	33.0	3.93	277.7	79.4	18.5	0.13 179.75
1207	4	4.687	33.0	3.90	259.7	68.0	16.7	0.12 169.00
1210	6	5.034	33.1	3.88	260.0	67.3	16.9	0.12 169.0
1213	8	5.419	33.1	3.87	257.9	64.5	9.8	0.12 168.35
1216	10	5.823	33.1	3.86	257.1	62.7	8.9	0.12 168.25
1219	12	6.137	33.1	3.86	256.8	60.9	8.1	0.12 168.25
1222	14	6.324	33.0	3.85	256.1	58.3	7.9	0.12 168.25 4.95

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc
SLOW RECHARGE
1m TURB, NO SHEEN / ODOUR, CLEAN

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments
Glass amber (100-250ml)		none		
Glass vial (40mL)		HCl	Duplicate ID	
Plastic (60mL) - metals*		HNO3		
Plastic (60mL) - cyanide, CrVI*		NaOH	Triplicate ID	
Plastic (60mL) - nutrients		H2SO4		
Plastic (500mL) - inorganics		none	Blanks	
Plastic ()			Rinsate ID	
Plastic ()				
Plastic ()				

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

Client: <u>GRR</u>		Job No: <u>J174436</u>		Well ID <u>EMB14</u>	
Project: <u>GME</u>		Sampled by: <u>VB</u>			
Location: <u>GRR & Vopak Site East Arm, NT</u>		Date: <u>21/1/22</u>			

WELL DETAILS			SAMPLING EQUIPMENT				*Other Sampling Equipment / Method
Well depth:	<u>9.314</u> (m)	Device:	<u>micropurge</u>	<u>peristaltic</u>	<u>footvalve</u>	<u>bailer</u>	
Casing diameter:	<u>50</u> (mm)	Method:	<u>low-flow</u>	<u>4-well-volume</u>	<u>purged dry</u>		
Casing type:	<u>RVC</u> / steel / other	WQM Make:	<u>YSI</u>				
Depth to product	<u>-</u> (m bTOC)	WL Meter:	<u>interface</u> / non-interface				
Depth to water:	<u>1.709</u> (m bTOC)	Screen (from - to), m	<u>6.314 - 9.314</u>				
Product thickness	<u>-</u> (m)	Pump Depth (m bTOC)					

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
CLOUDY / OVERCAST (PARTLY SUNNY, SLIGHT WIND)

Purging instructions:
 Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

Low Flow: The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
 Well volume: 50mm (2") diameter - 2 L/metre; 100mm (4") diameter - 8 L/metre; 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment <i>Turbidity, Colour, Odour, Sheen, etc</i>
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond <u>µS/cm</u> / <u>mS/cm</u>	ORP mV	DO mg/L / ppm / %	
1237	1NT	2.049	34.0	5.77	205.6	45.7	59.6	132.60 0.09
1241	2	2.991	34.2	6.05	196.6	38.0	54.8	127.40 0.09
1244	4	3.788	34.2	6.16	191.0	34.4	53.6	123.50 0.09
1247	6	4.418	34.2	6.21	190.8	32.1	53.1	124.15 0.09
1250	8	5.166	34.2	6.24	193.0	30.3	52.2	126.10 0.09
1253	10	6.084	34.3	6.28	189.5	30.8	50.0	128.5 0.09
1256	12	6.138	34.1	6.30	193.7	29.6	52.0	125.45 0.09 6.13

Observations during Sampling: eg. odours, sheens, turbidity, water colour, etc
SLOW MECHANICAL
L-M TURB, CLEAR, NO SHEEN/ODOUR

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments
Glass amber (100-250ml)		none	Duplicate ID	
Glass vial (40mL)		HCl		
Plastic (60mL) - metals*		HNO3	Triplicate ID	
Plastic (60mL) - cyanide, CrVI*		NaOH		
Plastic (60mL) - nutrients		H2SO4	Blanks	
Plastic (500mL) - inorganics		none		
Plastic ()			Rinsate ID	
Plastic ()				

*samples for dissolved metals to be filtered in the field prior to filling sampling container

23 February 2022

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Technical Director
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Northern Territory 0822

RE: GLOBAL RESOURCE RECOVERY – MONTHLY GROUNDWATER MONITORING EVENT (FEBRUARY 2022)

1.0 Introduction

Greencap Pty Ltd (Greencap) was commissioned by Global Resource Recovery (GRR) to implement a groundwater monitoring program, inclusive of monthly, quarterly and annual monitoring events at the Vopak Terminal located at East Arm, Northern Territory (the Site).

Greencap has previously undertaken monthly groundwater monitoring at the Site in accordance with Attachment B of the Environment Protection Licence (EPL) 229-01.

This report details the results of the February 2022 monthly monitoring event.

2.0 Groundwater Monthly Monitoring Event – February 2022

The monthly monitoring event included:

- gauging of water levels in all five monitoring bores.
- measurement of field parameters in two monitoring bores.

2.1 Methodology

Greencap conducted a monitoring event on 23 February 2021 involving the gauging of five monitoring bores (EMB7, EMB12, EMB13, EMB14 and EMB15) and the measurement of field parameters in two monitoring bores (EMB13 and EMB14).

The following methodology was applied:

- Measuring standing water levels (SWL) from the surveyed point at the top of the casings using water/product interface water level meter prior to sampling.
- Monitoring physio-chemical parameters (pH, temperature, dissolved oxygen, electrical conductivity, salinity, total dissolved solids, turbidity and oxidation-reduction potential) during purging using a calibrated water quality meter. A low flow peristaltic pump with monitoring bore-specific dedicated tubing was used to draw groundwater from the monitoring bores. Field parameters were recorded once they were deemed to have stabilised. Field observations were recorded during sampling including aesthetic evidence of contamination such as sheen, colour and odour.

2.2 Results

The recorded SWLs and measured field parameters are presented in Table 1 and Table 2 respectively.

Table 1 – February 2022 Groundwater Levels

Well ID	Date	SWL			Depth of Bore (m)
		mBTOC	mBGL	mAHD	
EMB7	23/02/2022	1.044	1.044	5.381	9.237
EMB12	23/02/2022	1.175	1.175	5.325	9.325
EMB13	23/02/2022	2.411	1.611	6.425	10.245
EMB14	23/02/2022	2.034	1.334	7.221	9.803
EMB15	23/02/2022	0.69	0.69	5.964	9.314

mBTOC – metres below top of casing

mBGL – metres below ground level

mAHD – metres Australian Height Datum

Table 2 – February 2022 Field Parameters

Well ID	pH	Temperature (°C)	Dissolved Oxygen (% saturation)	Electrical Conductivity (µS/cm)	Salinity (PSU)	Total Dissolved Solids (mg/L)	Turbidity (NTU)	ORP (mV)
EMB13	4.06	31.8	14	239.9	0.11	154.7	5.03	78.3
EMB14	6.46	33.1	20.3	174.2	0.08	113.1	5.87	36.3

Field records are presented in Attachment 2.

The next groundwater monitoring event is scheduled to occur in March 2022.

Attachments

- 1 Statements of Limitation
- 2 Field Record Sheets

Yours Sincerely,



Varun Bhagwat
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 E: Varun.Bhagwat@greencap.com.au



Groundwater Monitoring Event – February 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 1: Statements of Limitation

Statements of Limitation

All and any Services proposed by Greencap to the Client were subject to the Terms and Conditions listed on the Greencap website at: <https://www.greencap.com.au/terms-conditions> Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap does not agree to any alternative terms or variation of these terms if subsequently proposed by the Client. The Services were carried out in accordance with the current and relevant industry standards of testing, interpretation and analysis. The Services were carried out in accordance with Commonwealth, State, Territory or Government legislation, regulations and/or guidelines. The Client was deemed to have accepted these Terms when the Client signed the Proposal (where indicated) or when the Company commenced the Services at the request (written or otherwise) of the Client.

The services were carried out for the Specific Purpose, outlined in the body of the Proposal. To the fullest extent permitted by law, Greencap, its related bodies corporate, its officers, consultants, employees and agents assume no liability, and will not be liable to any person, or in relation to, any losses, damages, costs or expenses, and whether arising in contract, tort including negligence, under statute, in equity or otherwise, arising out of, or in connection with, any matter outside the Specific Purpose.

The Client acknowledged and agreed that proposed investigations were to rely on information provided to Greencap by the Client or other third parties. Greencap made no representation or warranty regarding the completeness or accuracy of any descriptions or conclusions based on information supplied to it by the Client, its employees or other third parties during provision of the Services. Under no circumstances shall Greencap have any liability for, or in relation to, any work, reports, information, plans, designs, or specifications supplied or prepared by any third party, including any third party recommended by Greencap. The Client releases and indemnifies Greencap from and against all Claims arising from errors, omissions or inaccuracies in documents or other information provided to Greencap by the Client, its employees or other third parties.

The Client was to ensure that Greencap had access to all information, sites and buildings as required by or necessary for Greencap to undertake the Services. Notwithstanding any other provision in these Terms, Greencap will have no liability to the Client or any third party to the extent that the performance of the Services was not able to be undertaken (in whole or in part) due to access to any relevant sites or buildings being prevented or delayed due to the Client or their respective employees or contractors expressing safety or health concerns associated with such access.

Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap, its related bodies corporate, its officers, employees and agents assume no liability and will not be liable for lost profit, revenue, production, contract, opportunity, loss arising from business interruption or delay, indirect or consequential loss or loss to the extent caused or contributed to by the Client or third parties, suffered or incurred arising out of or in connection with our Proposals, Reports, the Project or the Agreement. In the event Greencap is found by a Court or Tribunal to be liable to the Client for any loss or damage arising in connection with the Services, the Client's entitlement to recover damages from Greencap shall be reduced by such amount as reflects the extent to which any act, default, omission or negligence of the Client, or any third party, caused or contributed to such loss or damage. Unless otherwise agreed in writing and signed by both parties, Greencap's total aggregate liability will not exceed the total consulting fees paid by the client in relation to this Proposal. For further detail, see Greencap's Terms and Conditions available at <https://www.greencap.com.au/terms-conditions>

The Report is provided for the exclusive use of the Client and for this Project only, in accordance with the Scope and Specific Purpose as outlined in the Agreement, and only those third parties who have been authorized in writing by Greencap. It should not be used for other purposes, other projects or by a third party unless otherwise agreed and authorized in writing by Greencap. Any person relying upon this Report beyond its exclusive use and Specific Purpose, and without the express written consent of Greencap, does so entirely at their own risk and without recourse to Greencap for any loss, liability or damage. To the extent permitted by law, Greencap assumes no responsibility for any loss, liability, damage, costs or expenses arising from interpretations or conclusions made by others, or use of the Report by a third party. Except as specifically agreed by Greencap in writing, it does not authorize the use of this Report by any third party. It is the responsibility of third parties to independently make inquiries or seek advice in relation to their particular requirements and proposed use of the site.

The conclusions, or data referred to in this Report, should not be used as part of a specification for a project without review and written agreement by Greencap. This Report has been written as advice and opinion, rather than with the purpose of specifying instructions for design or redevelopment. Greencap does not purport to recommend or induce a decision to make (or not make) any purchase, disposal, investment, divestment, financial commitment or otherwise in relation to the site it investigated.

This Report should be read in whole and should not be copied in part or altered. The Report as a whole set outs the findings of the investigations. No responsibility is accepted by Greencap for use of parts of the Report in the absence (or out of context) of the balance of the Report.



Groundwater Monitoring Event – February 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 2: Field Record Sheets

Client: GRR		Job No: J174436
Project: GME		Gauged by: VB
Location: GRR & Vopak Site, Berrimah		Date: 23/2/22

Water Level Dipper Type (interphase, length etc): IP

[illegible]

Observations / Comments:

Weather Conditions (e.g. cloudy, sunny, windy etc), Pumping, etc

OVERCAST, RAINED RELENTLY

Groundwater Sampling Record

Client: <u>GRR</u>		Job No: <u>J174436</u>		Well ID <u>EMB13</u>	
Project: <u>GME</u>		Sampled by: <u>VB</u>			
Location: <u>GRR & Vopak Site, Berrimah</u>		Date: <u>23/2/22</u>			

WELL DETAILS			SAMPLING EQUIPMENT		
Well depth: <u>10.245</u> (m)	Device: <u>micropurge</u> <u>peristaltic</u> footvalve bailer	*Other Sampling Equipment / Method			
Casing diameter: <u>50</u> (mm)	Method: <u>low-flow</u> 4-well-volume purged dry				
Casing type: <u>PVC</u> / steel / other	WQM Make: <u>YSI</u>				
Depth to product (m bTOC)	WL Meter: <u>interface</u> non-interface				
Depth to water: <u>2.411</u> (m bTOC)	Screen (from - to), m <u>7.245 - 10.245</u>				
Product thickness (m)	Pump Depth (m bTOC)				

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
OVERCAST, RECENTLY RAINING, SLIGHT WIND.

Purging instructions:
Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre. 100mm (4") diameter - 8 L/metre. 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment Turbidity, Colour, Odour, Sheen, etc
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond <u>µS/cm</u> / mS/cm	ORP mV	DO mg/L / ppm / %	
0955	1NT	2.645	31.3	5.87	284.5	91.2	18.1	<u>5AL</u> <u>TDS</u> <u>NTU</u> <u>PSU</u> <u>mg/L</u>
0958	2	3.626	31.5	4.48	282.7	85.0	15.5	0.13 186.55
1001	4	4.151	31.5	4.19	280.6	82.8	14.1	0.13 181.35
1004	6	4.673	31.6	4.05	260.1	79.6	13.3	0.12 169.65
1007	8	5.054	31.7	4.08	246.1	79.4	13.4	0.11 159.25
1010	10	5.561	31.7	4.09	239.6	81.2	13.6	0.11 156.00
1013	12	5.805	31.7	4.07	241.4	78.1	13.8	0.11 156.00
1016	14	5.991	31.8	4.06	239.9	78.3	14.0	0.11 154.70

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc
Slow RECHARGE, SAMPLED AFTER 14 L PURGED.
L-M TURBIDITY, CLEAR, NO SHEEN/ODOUR

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments
Glass amber (100-250ml)		none	Duplicate ID	
Glass vial (40mL)		HCl		
Plastic (60mL) - metals*		HNO3	Triplicate ID	
Plastic (60mL) - cyanide, CrVI*		NaOH		
Plastic (60mL) - nutrients		H2SO4	Blanks	
Plastic (500mL) - inorganics		none		
Plastic ()			Rinsate ID	
Plastic ()				

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

Client: <u>GRR</u>		Job No: <u>J174436</u>		Well ID <u>EMB14</u>					
Project: <u>GME</u>		Sampled by: <u>VB</u>							
Location: <u>GRR & Vopak Site, Berrimah</u>		Date: <u>23/2/21</u>							
WELL DETAILS			SAMPLING EQUIPMENT						
Well depth: <u>9.314</u> (m)			Device: micropurge <u>peristaltic</u> footvalve bailer						
Casing diameter: <u>50</u> (mm)			Method: <u>low-flow</u> 4-well-volume purged dry						
Casing type: <u>PVC</u> / steel / other			WQM Make: <u>YSI</u>						
Depth to product: <u>—</u> (m bTOC)			WL Meter: <u>interface</u> non-interface						
Depth to water: <u>2.034</u> (m bTOC)			Screen (from - to), m <u>6.314 - 9.314</u>						
Product thickness: <u>—</u> (m)			Pump Depth (m bTOC)						
Field observations: eg. well condition, nearby activities, weather, vegetation, etc <u>PART CLOUDY / PART SUNNY, WINDY</u>									
Purging instructions: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.									
4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart. <u>Well volume, 50mm (2") diameter - 2 L/metre, 100mm (4") diameter - 8 L/metre, 150mm (6") diameter - 18 L/metre</u>									
Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment	
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond <u>µS/cm</u> / mS/cm	ORP mV	DO mg/L / ppm / %	Turbidity, Colour, Odour, Sheen, etc <u>SAL</u> <u>TDS</u> <u>psu</u> <u>mg/L</u>	
1035	INT	2.246	32.5	5.79	171.0	54.4	17.9	0.08	110.50
1038	2	3.064	32.8	6.09	168.8	33.9	23.2	0.08	108.55
1041	4	3.710	32.9	6.27	157.4	34.9	19.9	0.07	102.70
1044	6	4.263	33.0	6.31	159.3	38.1	16.7	0.07	104.00
1047	8	4.848	33.0	6.41	162.6	29.8	16.1	0.08	106.90
1050	10	5.411	33.0	6.42	168.6	25.6	18.6	0.08	110.50
1053	12	5.532	33.1	6.46	174.2	36.3	20.3	0.08	113.10
Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc <u>SLOW RECHARGE</u> <u>L-M TURBIDITY, CLEAR, NO SHEEN / ODOUR</u>									
Container Volume (L)	No of containers	Preservative	Duplications					Other Comments	
Glass amber (100-250ml)		none	Duplicate ID						
Glass vial (40mL)		HCl	TriPLICATE ID						
Plastic (60mL) - metals*		HNO3	Blanks						
Plastic (60mL) - cyanide, CrVI*		NaOH	Rinsate ID						
Plastic (60mL) - nutrients		H2SO4							
Plastic (500mL) - inorganics		none							
Plastic ()									
Plastic ()									
*samples for dissolved metals to be filtered in the field prior to filling sampling container									



20 April 2022

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RE: GLOBAL RESOURCE RECOVERY – ANNUAL GROUNDWATER MONITORING EVENT (MARCH 2022)

1.0 Introduction

1.1 Background

Greencap Pty Ltd (Greencap) was commissioned by Global Resource Recovery (GRR) to implement a groundwater monitoring program, inclusive of monthly, quarterly and annual monitoring events at the Vopak Terminal located at East Arm, Northern Territory (the Site).

Greencap has undertaken an annual groundwater monitoring at the Site in accordance with the Northern Territory (NT) Environment Protection Authority (EPA) Environmental Protection Licence (EPL) 229-01 (the Licence) – attached in Appendix A.

This report details the results of the March 2022 annual monitoring event.

This document has been prepared with the reference to the (NT EPA): *Guideline for Reporting on Environmental Monitoring, 2016*.

1.2 Monitoring Scope

The groundwater monitoring scope and analytical program are outlined in the Licence (Appendix A), inclusive of annual groundwater sampling from monitoring bores EMB7, EMB12, EMB13, EMB14 and EMB15.

The results of groundwater sampling have not been compared to any criteria as there are no specific trigger values listed in the Licence. Results summary tables are included in Attachment 3.

1.3 Previous Annual Monitoring Event

A previous annual monitoring event was conducted in March 2021 by EcOz Environmental Consulting. A comparison of analytical results above laboratory limits of reporting (LoRs) between the two annual monitoring events is presented in Table 3.

2.0 Groundwater Quarterly Monitoring Event – March 2022

The annual monitoring event included:

- Gauging of water levels in five monitoring bores (EMB7, EMB12, EMB13, EMB14 and EMB15).
- Measurement of field parameters in five monitoring bores (EMB7, EMB12, EMB13, EMB14 and EMB15).
- Laboratory analytical testing of samples collected from EMB7, EMB12, EMB13, EMB14 and EMB15, including:
 - Ø Major cations and anions
 - Ø Nutrients

- Ø Heavy metals
- Ø Hydrocarbon compounds
- Ø Cyanide
- Ø Glycols
- Ø Polychlorinated Biphenyls (PCBs)
- Ø Per- and polyfluoroalkyl substances (PFAS)

2.1 Sampling Methodology

Four groundwater monitoring bores (EMB7, EMB12, EMB13 and EMB14) were sampled using an industry standard low flow groundwater sampling techniques with dedicated tubing and in accordance with AS/NZS 5667.1:1998, AS/NZS 5667.11:1998 and <https://www.waterquality.gov.au/anz-guidelines>. The flow rate was monitored and regulated using an interface probe to maintain a stable water level during purging and sampling of groundwater. One groundwater monitoring bore (EMB15) was sampled using a four well-volume technique using a dedicated bailer in accordance with the methodology presented in *NT Department of Mines and Energy Methodology for the Sampling of Ground Waters (2009)*.

The following methodology was applied:

- Measuring standing water levels (SWLs) from the surveyed point at the top of the casings using water/product interface water level meter prior to sampling.
- Monitoring physio-chemical parameters (pH, temperature, dissolved oxygen, electrical conductivity, salinity, total dissolved solids, turbidity and oxidation-reduction potential) during purging using a calibrated water quality meter. Sampling occurred when the drawdown and these parameters had stabilised within the ranges presented in *NT Department of Mines and Energy Methodology for the Sampling of Ground Waters (2009)*.
- The sampler wore a clean pair of disposable nitrile gloves when collecting each sample.
- All groundwater samples collected in appropriate bottles/containers provided by analytical laboratories and placed in a chilled esky for transportation immediately after collection.
- Field observations were recorded during sampling including aesthetic evidence of contamination such as sheen, colour and odour.
- Collection of appropriate quality assurance/quality control (QA/QC) samples including intra- and inter-laboratory duplicates and rinsate and trip blanks.

2.2 Field Observations

Observations noted during the monitoring event were recorded on field record sheets and included groundwater colour, odours, sheens and any other anomalies. The groundwater was generally clear and no odours or sheens were noted from any of the bores during the monitoring.

The recorded SWLs and measured field parameters are presented in Table 1 and Table 2 respectively.

Table 1 – March 2022 Groundwater Levels

Well ID	Date	SWL			Depth of Bore (m)
		mBTOC	mBGL	mAHD	
EMB7	25/03/22	1.298	1.298	5.127	9.237
EMB12	25/03/22	1.242	1.242	5.258	9.325
EMB13	25/03/22	2.689	1.889	6.147	10.245

Well ID	Date	SWL			Depth of Bore (m)
		mBTOC	mBGL	mAHD	
EMB14	25/03/22	2.665	1.965	6.59	9.803
EMB15	25/03/22	0.794	0.794	5.86	9.314

mBTOC – metres below top of casing

mBGL – metres below ground level

mAHD – metres Australian Height Datum

Table 2 – March 2022 Field Parameters

Well ID	pH	Temperature (°C)	Dissolved Oxygen (% saturation)	Electrical Conductivity (µS/cm)	Salinity (PSU)	Total Dissolved Solids (mg/L)	Turbidity (NTU)	ORP (mV)
EMB7	5.93	32.9	46.5	193.4	0.10	132	4.73	106.3
EMB12	6.44	36.5	48.1	390.8	0.13	311	6.01	94.2
EMB13	4	32.4	26.8	246.1	0.11	160	5.18	82.5
EMB14	5.45	35.5	35.6	211.4	0.12	148	5.73	118.8
EMB15	4.29	35.5	64.7	201.3	0.71	932	9.33	172.8

Field records are presented in Attachment 2.

2.3 Analytical Results

Groundwater samples were analysed at National Association of Testing Authorities (NATA) - accredited laboratories (Eurofins – primary, ALS – secondary). The results are included in Attachment 3 and are summarised below in Table 3. Laboratory certificates of analysis are included in Appendix B.

Table 3 – Analytical Results Summary Above Laboratory Limits of Reporting (LOR)

Parameter	Date	Unit of Measurement	LOR	Range of Analytical Results				
				EMB7	EMB12	EMB13	EMB14	EMB15
Nutrients & Inorganics								
Total Phosphate (as P)	24/03/21	µg/L	10	<10	<10	<10	<10	<10
	25/03/22	µg/L		40	20	30	30	60
Total Nitrogen	24/03/21	µg/L	200	1,800	200	5,800	6,400	800
	25/03/22	µg/L		2,200	330	5,100	8,100	1,500
Kjeldahl Nitrogen Total	24/03/21	µg/L	200	1,200	<100	500	600	100
	25/03/22	µg/L		1,000	<200	400	2,300	200
Oxides of Nitrogen	24/03/21	µg/L	50	600	170	5,300	5,780	720
	25/03/22	µg/L		1,200	330	4,700	5,800	1,300
Ammonia (as N)	24/03/21	µg/L	10	1,320	30	40	30	30
	25/03/22	µg/L		1,000	100	80	60	70
Cyanide (total)	24/03/21	µg/L	5	<4	<4	<4	<4	<4
	25/03/22	µg/L		<5	<5	<5	<5	<5

Parameter	Date	Unit of Measurement	LOR	Range of Analytical Results				
				EMB7	EMB12	EMB13	EMB14	EMB15
Anions								
Chloride	24/03/21	µg/L	1,000	43,000	119,000	68,000	23,000	442,000
	25/03/22	µg/L		42,000	9,200	41,000	46,000	380,000
Cations								
Calcium	24/03/21	µg/L	500	2,000	11,000	1,000	29,000	6,000
	25/03/22	µg/L		8,800	8,300	2,000	17,000	12,000
Magnesium	24/03/21	µg/L	500	1,000	6,000	<1,000	2,000	26,000
	25/03/22	µg/L		900	1,000	700	1,500	21,000
Potassium	24/03/21	µg/L	500	2,000	4,000	<1,000	3,000	2,000
	25/03/22	µg/L		2,000	6,200	1,300	2,900	1,400
Sodium	24/03/21	µg/L	500	21,000	68,000	19,000	18,000	250,000
	25/03/22	µg/L		22,000	6,600	21,000	3,200	240,000
Heavy Metals (filtered)								
Arsenic	24/03/21	µg/L	1	<1	1	1	<1	2
	25/03/22	µg/L		<1	<1	2	<1	1
Barium	24/03/21	µg/L	1	107	364	59	321	98
	25/03/22	µg/L		182	255	188	357	122
Boron	24/03/21	µg/L	50	<50	<50	<50	<50	<50
	25/03/22	µg/L		530	530	720	590	730
Cadmium	24/03/21	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	0.1
	25/03/22	µg/L		<0.1	<0.1	<0.1	<0.1	0.1
Copper	24/03/21	µg/L	1	3	3	<1	<1	8
	25/03/22	µg/L		1	<1	2	<1	11
Lead	24/03/21	µg/L	1	4	<1	5	<1	25
	25/03/22	µg/L		<1	<1	1	<1	2
Manganese	24/03/21	µg/L	1	389	1,600	48	20	2,430
	25/03/22	µg/L		311	1	27	1	2,000
Nickel	24/03/21	µg/L	1	2	3	1	<1	6
	25/03/22	µg/L		1	3	1	1	5
Zinc	24/03/21	µg/L	5	22	63	55	275	23
	25/03/22	µg/L		15	<5	13	420	31
PFAS								
Sum of PFAS (n=30)	24/03/21	µg/L	0.1	96.6	1.7	22.7	3.65	0.19
	25/03/22	µg/L		40.07	0.22	47.56	1.02	0.3

The results for the March 2022 annual monitoring event are summarised as follows:

- Antimony, beryllium, chromium, mercury, selenium and vanadium (all filtered), hydroxide alkalinity as CaCO_3 , carbonate alkalinity as CaCO_3 , total recoverable hydrocarbons (TRH), benzene, ethylbenzene, toluene, xylene, naphthalene (BTEXN), polycyclic aromatic hydrocarbons (PAH), total cyanides, glycols, phenols, polychlorinated biphenyls (PCBs) were all reported to be below the LoRs for all monitoring bores.
- Several nutrients and inorganics, anions and cations and filtered heavy metals – barium, boron, manganese and nickel were reported above the LoRs in all monitoring bores.
- Zinc and Total Kjeldahl Nitrogen were reported above LoRs in all monitoring bores with the exception of EMB12.
- Bicarbonate and total alkalinity as CaCO_3 were reported above LoRs in all monitoring bores with the exception of EMB13.
- Arsenic and lead were reported above LoRs in EMB13 and EMB15 and cobalt was reported above LoRs in EMB7 and EMB15.
- Copper was reported above the LoRs in EMB7, EMB13 and EMB15.
- Cadmium was reported above the LoRs in EMB15.
- A range of Per- and Polyfluoroalkyl Substances (PFAS) were detected in all monitoring bores.

2.4 QA/QC Results

Groundwater Duplicate Analysis

Field duplicates (QC01 and QC01A, duplicates of EMB13) were collected during the monitoring event and analysed at the intra (Eurofins) and inter (ALS) laboratories for benzene, toluene, ethylbenzene, xylene, naphthalene, TRH, PAH and phenols.

Duplicate analytical results were assessed by calculating relative percent differences between primary sample results and duplicate sample results. All of the inter and intra laboratory duplicate groundwater analyses had RPD values below the recommended comparison criteria of 50%.

A table summarising the duplicate sample results is presented at the end of this report (refer to Attachment 3).

Blank Analyses

Rinsate blank samples (RB01) was collected on 25 March 2022 and analysed at the primary laboratory for TRH and BTEXN. The rinsate blank samples were collected from decontaminated sampling equipment to ensure adequate cleaning has occurred.

A trip blank sample (TB01) was prepared and kept with the portable sample cooler for the duration of the and delivered to the primary laboratory for TRH and BTEXN analysis. The trip blanks were prepared using de-ionised water to detect potential cross-contamination throughout the sampling and sample delivery stages of the GME.

A table summarising the rinsate and trip blanks sample results is presented at the end of this report (refer to Attachment 3).

3.0 Conclusions

Greencap conducted an annual groundwater monitoring event at the Vopak Terminal at East Arm in accordance with EPL229-01 in March 2022. Physico-chemical groundwater parameters were measured in the field and samples were collected from all monitoring bores and submitted to NATA-accredited laboratories for analytical testing.

Many analytes including filtered metals (antimony, beryllium, cadmium, chromium, mercury, selenium and vanadium), hydroxide alkalinity as CaCO₃, carbonate alkalinity as CaCO₃, total recoverable hydrocarbons, benzene, ethylbenzene, toluene, xylene, naphthalene, polycyclic aromatic hydrocarbons, total cyanides, glycols, phenols, polychlorinated biphenyls were all reported to be below the LoRs for all monitoring bores.

Several nutrients and inorganics, anions and cations and filtered heavy metals – barium, boron, manganese and nickel were reported above the LoRs in all monitoring bores.

Filtered metals (arsenic, cadmium, cobalt, copper, lead and zinc), Total Kjeldahl Nitrogen, bicarbonate and total alkalinity as CaCO₃ were reported in some of the monitoring bores.

A range of Per- and Polyfluoroalkyl Substances (PFAS) compounds were detected in both monitoring bores.

The next annual groundwater monitoring event is scheduled to occur in March 2023.

Attachments

- 1 Statements of Limitation
- 2 Field Record Sheets
- 3 Results Summary Tables (including QA/QC)

Appendices

- A Environmental Protection Licence 229-01
- B Laboratory Certificates of Analysis

Yours Sincerely,



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Groundwater Monitoring Event – March 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 1: Statements of Limitation

Statements of Limitation

All and any Services proposed by Greencap to the Client were subject to the Terms and Conditions listed on the Greencap website at: <https://www.greencap.com.au/terms-conditions> Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap does not agree to any alternative terms or variation of these terms if subsequently proposed by the Client. The Services were carried out in accordance with the current and relevant industry standards of testing, interpretation and analysis. The Services were carried out in accordance with Commonwealth, State, Territory or Government legislation, regulations and/or guidelines. The Client was deemed to have accepted these Terms when the Client signed the Proposal (where indicated) or when the Company commenced the Services at the request (written or otherwise) of the Client.

The services were carried out for the Specific Purpose, outlined in the body of the Proposal. To the fullest extent permitted by law, Greencap, its related bodies corporate, its officers, consultants, employees and agents assume no liability, and will not be liable to any person, or in relation to, any losses, damages, costs or expenses, and whether arising in contract, tort including negligence, under statute, in equity or otherwise, arising out of, or in connection with, any matter outside the Specific Purpose.

The Client acknowledged and agreed that proposed investigations were to rely on information provided to Greencap by the Client or other third parties. Greencap made no representation or warranty regarding the completeness or accuracy of any descriptions or conclusions based on information supplied to it by the Client, its employees or other third parties during provision of the Services. Under no circumstances shall Greencap have any liability for, or in relation to, any work, reports, information, plans, designs, or specifications supplied or prepared by any third party, including any third party recommended by Greencap. The Client releases and indemnifies Greencap from and against all Claims arising from errors, omissions or inaccuracies in documents or other information provided to Greencap by the Client, its employees or other third parties.

The Client was to ensure that Greencap had access to all information, sites and buildings as required by or necessary for Greencap to undertake the Services. Notwithstanding any other provision in these Terms, Greencap will have no liability to the Client or any third party to the extent that the performance of the Services was not able to be undertaken (in whole or in part) due to access to any relevant sites or buildings being prevented or delayed due to the Client or their respective employees or contractors expressing safety or health concerns associated with such access.

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Groundwater Monitoring Event – March 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 2: Field Record Sheets

Client: GRR		Job No: J174436
Project: GME		Gauged by: VB
Location: GRR Site, East Arm		Date: 25/3/22

Water Level Dipper Type (interphase, length etc): IP

[illegible]

Observations / Comments:

Weather Conditions (e.g. cloudy, sunny, windy etc), Pumping, etc

SUNNY | SLIGHT WIND

Groundwater Sampling Record

Client: <u>GRL</u>		Job No: <u>J174436</u>		Well ID <u>EMB7</u>	
Project: <u>GME</u>		Sampled by: <u>VB</u>			
Location: <u>EAST ARM</u>		Date: <u>25/3/22</u>			

WELL DETAILS			SAMPLING EQUIPMENT				*Other Sampling Equipment / Method	
Well depth:	<u>9.237</u>	(m)	Device:	<u>micropurge</u>	<u>peristaltic</u>	footvalve		bailer
Casing diameter:	<u>50</u>	(mm)	Method:	<u>low-flow</u>	4-well-volume	purged dry		
Casing type:	<u>PVC / steel / other</u>		WQM Make:	<u>YSI</u>				
Depth to product	<u>—</u>	(m bTOC)	WL Meter:	<u>interface</u> non-interface				
Depth to water:	<u>1.298</u>	(m bTOC)	Screen (from - to), m	<u>6.237 - 9.237</u>				
Product thickness	<u>—</u>	(m)	Pump Depth (m bTOC)					

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
SUNNY / SLIGHT WIND

Purging instructions:
Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

Low Flow: The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre, 100mm (4") diameter - 8 L/metre, 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment		
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond <u>µS/cm</u> mS/cm	ORP mV	DO mg/L / ppm / %	Turbidity, Colour, Odour, Sheen, etc		
								TDS mg/L	SAL PSU	TURB NTU
1159	1NT	1.316	28.0	5.62	181.9	121.0	75.0	130.75	0.10	
1202	2	1.408	29.3	5.67	188.1	118.7	74.6	131.90	0.10	
1205	4	1.459	30.2	5.62	178.6	115.2	73.8	130.60	0.10	
1208	6	1.853	31.0	5.61	176.3	112.7	74.4	131.65	0.10	
1211	8	3.208	31.8	5.80	171.9	100.6	59.7	131.65	0.10	
1216	10	3.081	32.2	5.85	198.3	88.6	54.5	131.65	0.10	
1220	12	3.159	32.6	5.85	199.7	93.2	51.5	131.65	0.10	
1224	14	3.152	32.9	5.93	193.4	106.3	46.5	131.65	0.10	473
<u>SAMPLED</u>										

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc
L-M TURB, CLEAR, NO SHEEN/ODOURS
SLOW RECHARGE, SAMPLED AFTER 14L PURGED

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments
Glass amber (100-250ml)	<u>2</u>	none	Duplicate ID	
Glass vial (40mL)	<u>2</u>	HCl		
Plastic (60mL) - metals*	<u>1</u>	HNO3		
Plastic (60mL) - cyanide, CrVI*	<u>1</u>	NaOH	Triplicate ID	
Plastic (60mL) - nutrients	<u>1</u>	H2SO4	Blanks	
Plastic (500mL) - inorganics	<u>1</u>	none		
Plastic () <u>PFAS</u>	<u>2</u>			
Plastic () <u>GLYCOLS</u>	<u>2</u>			
			Rinsate ID	

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

Client: <u>GPR</u>		Job No: <u>1174436</u>	Well ID <u>EMB12</u>
Project: <u>GME</u>		Sampled by: <u>VB</u>	
Location: <u>EAST ARM, NT</u>		Date: <u>25/3/22</u>	
WELL DETAILS		SAMPLING EQUIPMENT	
Well depth: <u>9.325</u> (m)	Device: <u>micropurge</u> <u>peristaltic</u> footvalve bailer	*Other Sampling Equipment / Method	
Casing diameter: <u>50</u> (mm)	Method: <u>low-flow</u> 4-well-volume purged dry		
Casing type: <u>EVE</u> / steel / other	WQM Make: <u>YSI</u>		
Depth to product (m bTOC): <u>—</u>	WL Meter: <u>interface</u> non-interface		
Depth to water: <u>1.242</u> (m bTOC)	Screen (from - to), m: <u>6.325 - 9.325</u>		
Product thickness (m): <u>—</u>	Pump Depth (m bTOC): <u>—</u>		

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
SUNNY, SLIGHT WIND

Purging instructions:

Low Flow: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre, 100mm (4") diameter - 8 L/metre, 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment Turbidity, Colour, Odour, Sheen, etc
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond <u>µS/cm</u> mS/cm	ORP mV	DO mg/L / ppm / %	
1324	1NT	1.284	36.1	6.60	451.8	78.1	46.3	312.05 0.13
1327	2	2.264	36.1	6.42	443.9	60.1	47.9	316.05 0.13
1331	4	2.979	36.3	6.41	437.6	67.2	49.9	310.05 0.13
1334	6	3.638	36.5	6.45	411.3	95.2	49.5	310.65 0.13
1337	8	3.871	36.5	6.46	403.2	94.2	48.9	310.65 0.13
1340	10	4.156	36.5	6.45	397.1	94.1	48.3	310.65 0.13
1343	12	4.578	36.5	6.45	393.5	94.3	48.7	310.65 0.13
1346	14	4.583	36.5	6.44	390.8	94.2	48.1	310.65 0.13 6.01
				SAMPLED				

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc

SAMPLED AFTER 14L PURGED, SLOW RECHARGE
LM TURB, CLEAR, NO SHEENS/ODOURS

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments
Glass amber (100-250ml)	2	none	Duplicate ID	
Glass vial (40mL)	2	HCl	Triplicate ID	
Plastic (60mL) - metals*	1	HNO3	Blanks	
Plastic (60mL) - cyanide, CrVI*	1	NaOH	Rinsate ID	
Plastic (60mL) - nutrients	1	H2SO4		
Plastic (500mL) - inorganics	1	none		
Plastic () PFA	1			
Plastic () ALKAL	2			

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

Client: <u>GRR</u>		Job No: <u>J174436</u>		Well ID <u>EMB13</u>	
Project: <u>GME</u>		Sampled by: <u>VB</u>			
Location: <u>EAST ARM</u>		Date: <u>25/3/22</u>			

WELL DETAILS			SAMPLING EQUIPMENT				*Other Sampling Equipment / Method
Well depth: <u>10245</u> (m)	Device: <u>micropurge</u> <u>peristaltic</u> <u>footvalve</u> <u>bailer</u>						
Casing diameter: <u>50</u> (mm)	Method: <u>low-flow</u> <u>4-well-volume</u> <u>purged dry</u>						
Casing type: <u>PVC</u> / steel / other	WQM Make: <u>TS</u>						
Depth to product <u>-</u> (m bTOC)	WL Meter: <u>interface</u> <u>non-interface</u>						
Depth to water: <u>2.689</u> (m bTOC)	Screen (from - to), m <u>7.265 - 10.245</u>						
Product thickness <u>-</u> (m)	Pump Depth (m bTOC)						

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
SUNNY / CALM

Purging instructions:
Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre, 100mm (4") diameter - 8 L/metre, 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment Turbidity, Colour, Odour, Sheen, etc
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond <u>µS/cm</u> / mS/cm	ORP mV	DO <u>ppm</u> / %	
0922	1NT	2.991	32.2	7.39	276.0	61.7	26.7	180.05 0.13
0925	2	4.354	32.3	4.34	275.2	69.6	27.7	179.4 0.13
0928	4	4.811	32.3	4.00	273.8	70.8	27.8	178.1 0.13
0931	6	5.249	32.3	3.95	266.7	70.9	26.4	172.25 0.12
0934	8	5.569	32.4	4.03	241.9	73.3	26.1	155.35 0.11
0937	10	5.869	32.3	4.10	239.4	75.9	27.4	150.15 0.11
0940	12	5.901	32.4	4.09	231.2	76.2	27.0	150.80 0.11
0943	14	6.096	32.4	4.07	233.3	78.4	28.2	151.45 0.11
0946	16	6.111	22.4	4.00	246.1	82.5	26.8	159.96 0.11 5.18

Observations during Sampling: eg. odours, sheens, turbidity, water colour, etc
Clear, C-M turb, no sheen / odour
Slow recharge, sampled after 16L pumped

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments
Glass amber (100-250ml)	2	none	Duplicate ID <u>Q201</u> 1x Amber	
Glass vial (40mL)	2	HCl		
Plastic (60mL) - metals*	1	HNO3		
Plastic (60mL) - cyanide, CrVI*	1	NaOH	Triplicate ID <u>2x vial</u>	
Plastic (60mL) - nutrients	1	H2SO4	<u>Q201A</u> " "	
Plastic (500mL) - inorganics	1	none	Blanks	
Plastic () <u>PFA</u>	1		Rinsate ID	
Plastic () <u>GS/CA</u>	2		<u>R201</u> - 1 AMB / 2 WML	
			<u>T201</u> - 2 WML	

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

Client: <u>GRR</u>		Job No: <u>J174436</u>		Well ID <u>EMB14</u>	
Project: <u>LME</u>		Sampled by: <u>VB</u>			
Location: <u>EMB ARM</u>		Date: <u>25/3/22</u>			

WELL DETAILS			SAMPLING EQUIPMENT			
Well depth: <u>9.314</u>	(m)	Device: <u>micropurge</u> <u>peristaltic</u> footvalve bailer	*Other Sampling Equipment / Method			
Casing diameter: <u>50</u>	(mm)	Method: <u>low-flow</u> 4-well-volume purged dry				
Casing type: <u>PVC</u> / steel / other		WQM Make: <u>YSI</u>				
Depth to product	(m bTOC)	WL Meter: <u>interface</u> non-interface				
Depth to water: <u>2.665</u>	(m bTOC)	Screen (from - to), m <u>6.314 - 9.314</u>				
Product thickness	(m)	Pump Depth (m bTOC)				

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
SUNNY / CALM

Purging instructions:
Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater) Purging finishes when the three consecutive readings are within the ranges below.

Low Flow: The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre, 100mm (4") diameter - 8 L/metre, 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment Turbidity, Colour, Odour, Sheen, etc SAL TO5 TUNB P20 mg/L NTU
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond <u>µS/cm</u> / mS/cm	ORP mV	DO mg/L / ppm / %	
1035	1NT	2.712	35.7	4.97	228.1	100.6	35.2	
1038	2	3.882	35.4	5.52	221.3	126.0	40.7	0.12 148.25
1041	4	4.622	35.3	5.48	213.8	119.3	38.8	0.12 148.25
1044	6	5.176	35.3	5.41	210.1	113.5	37.4	0.12 148.25
1047	8	5.657	35.3	5.37	208.2	126.5	36.6	0.12 148.25
1050	10	6.266	35.3	5.29	209.6	99.5	34.9	0.12 148.25
1053	12	6.811	35.5	5.41	210.3	122.4	32.4	0.12 148.25
1056	14	7.161	35.4	5.45	211.9	91.5	32.5	0.12 148.25
1059	16	7.159	35.5	5.45	211.4	118.8	32.6	0.12 148.25 573

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc
L-M TUNB, CLEAR, NO SHEEN/ODOURS
SAMPLED AFTER 16L PURGED, SLOW RECHARGE

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments
Glass amber (100-250ml)	2	none	Duplicate ID	
Glass vial (40ml)	2	HCl		
Plastic (60ml) - metals*	1	HNO3	Triplicate ID	
Plastic (60ml) - cyanide, CrVI*	1	NaOH		
Plastic (60ml) - nutrients	1	H2SO4	Blanks Rinsate ID	
Plastic (500ml) - inorganics	1	none		
Plastic () <u>PFA</u>	1			
Plastic () <u>hexwls</u>	2			

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

Client: <u>LAN</u>		Job No: <u>1174436</u>		Well ID <u>EM 135</u>	
Project: <u>GME</u>		Sampled by: <u>VB</u>			
Location: <u>5m ST CRST ARM</u>		Date: <u>25/12/22</u>			

WELL DETAILS			SAMPLING EQUIPMENT		
Well depth: <u>9.314</u> (m)	Device: <u>micropurge</u> <u>peristaltic</u> <u>footvalve</u> <u>bailer</u>	*Other Sampling Equipment / Method			
Casing diameter: <u>50</u> (mm)	Method: <u>low-flow</u> <u>4-well-volume</u> <u>purged dry</u>				
Casing type: <u>PVC</u> steel / other	WQM Make: <u>751</u>				
Depth to product (m bTOC)	WL Meter: <u>interface</u> <u>non-interface</u>				
Depth to water: <u>0.744</u> (m bTOC)	Screen (from - to), m <u>6.314 - 9.314</u>				
Product thickness (m)	Pump Depth (m bTOC)				

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
Sunny / slight wind

Purging instructions:
Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume
The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre, 100mm (4") diameter - 8 L/metre, 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment <i>Turbidity, Colour, Odour, Sheen, etc</i>
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond <u>µS/cm</u> / mS/cm	ORP mV	DO mg/L / ppm / %	
1441	10	3.341	35.9	5.53	1430	68.2	89.0	TDS 929.50 0.70 mg/L BAL PSU T-NH NTU
1458	20	1.881	35.5	4.70	1560	90.1	93.6	98.50 0.74
1450	30	1.937	35.4	4.66	1620	120.3	72.7	952.60 0.75
1510	40	1.864	35.2	4.49	1870	147.1	68.1	941.70 0.71
1520	50	1.872	35.1	4.42	1904	182.4	65.2	938.40 0.70
1530	60	1.915	35.4	4.38	1932	168.3	64.3	942.60 0.73
1540	70	1.921	35.6	4.32	1996	161.7	64.8	937.10 0.74
1545	75	1.913	35.5	4.29	2013	172.8	64.7	932.30 0.71 9.33
SAMPLED								

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc
USED BAILER BECAUSE PERISTALTIC PUMP NOT WORKING PROPERLY. SAMPLED AFTER 75L PURGED. M-H TURB, PALE RED/BROWN, NO SHEEN/OODOUR

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments
Glass amber (100-250ml)	2	none	Duplicate ID	
Glass vial (40mL)	2	HCl		
Plastic (60mL) - metals*	1	HNO3		
Plastic (60mL) - cyanide, CrVI*	1	NaOH	TriPLICATE ID	
Plastic (60mL) - nutrients	1	H2SO4		
Plastic (500mL) - inorganics	1	none	Blanks	
Plastic () <u>PTM</u>	1			
Plastic () <u>4646ms</u>	2			
			Rinsate ID	

*samples for dissolved metals to be filtered in the field prior to filling sampling container



Groundwater Monitoring Event – March 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 3: Results Summary Tables (including QA/QC)

			SWL	Field Parameters										Metals															
			Standing Water Level	Temperature	pH	Electrical Conductivity	Salinity	ORP	Dissolved Oxygen	Total Dissolved Solids	Turbidity	Antimony (Filtered)	Arsenic (Filtered)	Barium (Filtered)	Beryllium (Filtered)	Boron (Filtered)	Cadmium (Filtered)	Chromium (II+VI) (Filtered)	Cobalt (Filtered)	Copper (Filtered)	Lead (Filtered)	Manganese (Filtered)	Mercury (Filtered)	Nickel (Filtered)	Selenium (Filtered)	Vanadium (Filtered)	Zinc (Filtered)		
			mg/L	°C	pH unit	(µS/cm)	PSU	mV %	% Sat.	mg/L	NTU	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L		
EQI												1	1	1	1	50	0.1	1	1	1	1	1	0.1	1	10	10	5		
Monitoring Round	Field ID	Sample Date																											
Mar-21	EMB7	24/03/2021	1.2	30.2	4.67	182.6	-	202.9	41.7	119	-	<1	<1	107	<1	<50	<0.1	<1	3	17	4	389	<0.1	2	<10	<10	22		
	EMB12		1.23	33.2	5.46	480.3	-	119.1	74.6	312	-	<1	1	364	<1	<50	<0.1	<1	3	2	<1	1600	<0.1	3	<10	<10	63		
	EMB13		1.61	31.5	3.78	246.8	-	222.6	43.9	160	-	<1	1	0.059	<1	50	<0.1	<1	<1	7	5	48	<0.1	1	<10	<10	55		
	EMB14		1.53	32.2	6.48	263.6	-	128.6	85.3	171	-	<1	<1	0.321	<1	<50	<0.1	<1	<1	<1	<1	2	<0.1	<1	<10	<10	275		
	EMB15		0.73	33.7	4.21	1446	-	216.7	55.9	940	-	<1	2	88	<1	<50	<0.1	<1	8	25	13	2430	<0.1	6	<10	<10	23		
Mar-22	EMB7	25/03/2022	1.298	32.9	5.93	8.9	0	108.3	45.6	5.85	4.73	<1	<1	182	<1	530	<0.1	<1	3	1	<1	311	<0.1	1	<10	<10	15		
	EMB12		1.242	36.5	6.44	8.2	0	94.2	48.1	5.26	6.01	<1	<1	255	<1	550	<0.1	<1	<1	<1	<1	1	<0.1	3	<10	<10	<5		
	EMB13		1.889	22.4	4	246.1	0.11	82.5	26.8	159.96	5.18	<1	2	188	<1	720	<0.1	<1	<1	2	1	27	<0.1	1	<10	<10	13		
	EMB14		1.965	35.5	5.45	6.9	0	118.8	35.6	4.55	5.73	<1	<1	357	<1	580	<0.1	<1	<1	<1	<1	1	<0.1	1	<10	<10	420		
	EMB15		0.794	35.5	4.29	201.3	0.71	172.8	64.7	932.3	9.33	<1	1	122	<1	730	0.1	<1	6	11	2	2000	<0.1	5	<10	<10	31		

			Inorganics								Anions								Cations								TRH - NEPM 1999 Fractions								TRH - NEPM 2013 Fractions								BTEX							
			Ammonia as N Nitrite + Nitrate (oxides of nitrogen) (as N) Nitrogen (Total) Total Kjeldahl Nitrogen Phosphate total (P) Cyanide (total)								Chloride Sulphate (as SO4) Carbonate Alkalinity (as CaCO3) Bicarbonate Alkalinity (as CaCO3) Hydroxide Alkalinity (as CaCO3) Total Alkalinity (as CaCO3)								Calcium Magnesium Potassium Sodium C6 - C9 C10 - C14 C15 - C28 C29-C36 C10 - C36 (Sum of total)								C6-C10 C6-C10 less BTEX (F1) C10-C16 C10-C16 less Naphthalene (F2) C16-C34 C34-C40 C10 - C40 (Sum of total)								Benzene Ethylbenzene Toluene Xylene (m & p) Xylene (o) Xylene Total															
EQL			10	50	200	200	10	5	1000	5000	10000	20000	20000	20000	500	500	500	500	20	50	100	100	100	20	20	50	50	100	100	100	1	1	1	2	1	2														
Monitoring Round	Field ID	Sample Date																																																
Mar-21	EMB7	24/03/2021	1320	600	1800	1200	<10	<4	43000	<1000	<1000	3000	<1000	3000	2000	1000	2000	21000	-	-	-	-	-	<20	<20	<50	<50	<100	<100	<100	<1	<1	<1	<2	<1	<2														
	EMB12		30	170	200	<100	<10	<4	119000	7000	<1000	14000	<1000	14000	11000	6000	4000	68000	-	-	-	-	-	<20	<20	<50	<50	<100	<100	<100	<1	<1	<1	<2	<1	<2														
	EMB13		40	5300	5800	500	<10	<4	68000	<1000	<1000	<1000	<1000	<1000	1000	<1000	<1000	19000	-	-	-	-	-	<20	<20	<50	<50	100	<100	100	<1	<1	<1	<2	<1	<2														
	EMB14		30	5780	6400	600	<10	<4	23000	14000	<1000	52000	<1000	52000	29000	2000	3000	18000	-	-	-	-	-	<20	<20	<50	<50	<100	<100	<100	<1	<1	<1	<2	<1	<2														
	EMB15		30	720	800	100	<10	<4	442000	63000	<1000	<1000	<1000	<1000	6000	26000	2000	250000	-	-	-	-	-	<20	<20	<50	<50	<100	<100	<100	<1	<1	<1	<2	<1	<2														
Mar-22	EMB7	25/03/2022	1000	1200	2200	1000	40	<5	42000	30000	<10000	150000	<20000	15000	8800	900	2000	22000	<20	<50	<100	<100	<100	<20	<20	<50	<50	<100	<100	<100	<1	<1	<1	<2	<1	<2														
	EMB12		100	330	330	<200	20	<5	9200	6100	<10000	98000	<20000	98000	8300	1000	6200	6600	<20	<50	<100	<100	<100	<20	<20	<50	<50	<100	<100	<100	<1	<1	<1	<2	<1	<2														
	EMB13		80	4700	5100	400	30	<5	41000	1600	<10000	<20000	<20000	<20000	2000	700	1300	21000	<20	<50	<100	<100	<100	<20	<20	<50	<50	100	<100	100	<1	<1	<1	<2	<1	<2														
	EMB14		60	5800	8100	2300	30	<5	46000	2300	<10000	41000	<20000	41000	17000	1500	2900	3200	<20	<50	<100	<100	<100	<20	<20	<50	<50	<100	<100	<100	<1	<1	<1	<2	<1	<2														
	EMB15		70	1300	1500	200	60	<5	380000	6100	<10000	<20000	<20000	<20000	12000	21000	1400	240000	<20	<50	<100	<100	<100	<20	<20	<50	<50	<100	<100	<100	<1	<1	<1	<2	<1	<2														

			PAH																				Phenolics		Halogenated Phenols						Polychlorinated Biphenyls						Herbicides											
			2,4-dimethylphenol μg/L	2,4-dinitrophenol μg/L	2-methylphenol μg/L	2-nitrophenol μg/L	3,4-dimethylphenol μg/L	4,6-Dinitro-2-methylphenol μg/L	4-chloro-3-methylphenol μg/L	4-nitrophenol μg/L	Acequinaphene μg/L	Acequinaphylene μg/L	Anthracene μg/L	Benzo(a)anthracene μg/L	Benzo(a)pyrene μg/L	Benzo(g,h,i)perylene μg/L	Benzo(k)fluoranthene μg/L	Benzo(b)fluoranthene μg/L	Chrysene μg/L	Cresol Total μg/L	Dibenz(a,h)anthracene μg/L	Fluoranthene μg/L	Fluorene μg/L	Indeno(1,2,3-cd)pyrene μg/L	Naphthalene μg/L	PAHS (Sum of total) μg/L	Phenanthrene μg/L	Phenol μg/L	Pyrene μg/L	4,6-Dinitro-o-cydonevyl phenol μg/L	Phenols (Total Halogenated) mg/L	Phenols (Total Non Halogenated) mg/L	2,4,5-trichlorophenol μg/L	2,4,6-trichlorophenol μg/L	2,4-dichlorophenol μg/L	2,6-dichlorophenol μg/L	2-chlorophenol μg/L	Pentachlorophenol μg/L	Tetrachlorophenols μg/L	Anochlor 1016 μg/L	Anochlor 1221 μg/L	Anochlor 1232 μg/L	Anochlor 1242 μg/L	Anochlor 1248 μg/L	Anochlor 1254 μg/L	Anochlor 1260 μg/L	PCBs (Sum of total) μg/L	Dinoseb μg/L
EQL			3	3	10	6	30	1	30	1	1	1	1	1	1	1	1	1	1	10	1	1	1	1	1	1	1	3	1	100	10	10	10	10	5	3	10	20	5	5	5	5	5	5	5	100		
Monitoring Round	Field ID	Sample Date																																														
Mar-21	EMB7	24/03/2021	<3	<3	<10	<6	<30	<10	<30	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<1	-	<1	<1	<1	<1	<1	-	-	-	-	<1	-					
	EMB12		<3	<3	<10	<6	<30	<10	<30	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	-	-	<1	-					
	EMB13		<3	<3	<10	<6	<30	<10	<30	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	-	-	<1	-			
	EMB14		<3	<3	<10	<6	<30	<10	<30	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	-	-	<1	-	
	EMB15		<3	<3	<10	<6	<30	<10	<30	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	-	-	-	<1	-	
Mar-22	EMB7	25/03/2022	<3	<3	<10	<6	<30	<10	<30	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<100	<10	<100	<10	<10	<10	<3	<3	<3	<10	<30	<30	<6	<6	<6	<6	<100		
	EMB12		<3	<3	<10	<6	<30	<10	<30	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<100	<10	<100	<10	<10	<10	<3	<3	<3	<10	<30	<30	<6	<6	<6	<6	<100	
	EMB13		<3	<3	<10	<6	<30	<10	<30	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<100	<10	<100	<10	<10	<10	<3	<3	<3	<10	<30	<30	<6	<6	<6	<6	<100	
	EMB14		<3	<3	<10	<6	<30	<10	<30	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<100	<10	<100	<10	<10	<10	<3	<3	<3	<10	<30	<30	<6	<6	<6	<6	<100	
	EMB15		<3	<3	<10	<6	<30	<10	<30	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<100	<10	<100	<10	<10	<10	<3	<3	<3	<10	<30	<30	<6	<6	<6	<6	<100	

[illegible]

**Groundwater Monitoring
Results Percentage Duplicate Table
March 2022**

J174436

			SDG Field ID Sampled Date/Time	28-Mar-22 EMB13 25/03/2022	28-Mar-22 QC01 25/03/2022	RPD	28-Mar-22 EMB13 25/03/2022	ALSE-Sydney 29-Mar-22 QC01A 25/03/2022	RPD
Chem_Group	ChemName	Units	EQL						
BTEX	Benzene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Ethylbenzene	µg/l	1 (Primary): 2 (Interlab)	<1.0	<1.0	0	<1.0	<2.0	0
	Toluene	µg/l	1 (Primary): 2 (Interlab)	<1.0	<1.0	0	<1.0	<2.0	0
	Xylene (m & p)	µg/l	2	<2.0	<2.0	0	<2.0	<2.0	0
	Xylene (o)	µg/l	1 (Primary): 2 (Interlab)	<1.0	<1.0	0	<1.0	<2.0	0
	Xylene Total	µg/l	3 (Primary): 2 (Interlab)	<3.0	<3.0	0	<3.0	<2.0	0
	C6-C10 less BTEX (F1)	mg/l	0.02	<0.02	<0.02	0	<0.02	<0.02	0
Halogenated Phenols	2,4,5-trichlorophenol	µg/l	10 (Primary): 1 (Interlab)	<10.0	<10.0	0	<10.0	<1.0	0
	2,4,6-trichlorophenol	µg/l	10 (Primary): 1 (Interlab)	<10.0	<10.0	0	<10.0	<1.0	0
	2,4-dichlorophenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	2,6-dichlorophenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	2-chlorophenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	Pentachlorophenol	µg/l	10 (Primary): 2 (Interlab)	<10.0	<10.0	0	<10.0	<2.0	0
	tetrachlorophenols	µg/l	30	<30.0	<30.0	0	<30.0		
Herbicides	Dinoseb	µg/l	100	<100.0	<100.0	0	<100.0		
PAH	Benzo(b+j)fluoranthene	mg/l	0.001	<0.001	<0.001	0	<0.001	<0.001	0
PAH/Phenols	2,4-dimethylphenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	2,4-dinitrophenol	mg/l	0.03	<0.03	<0.03	0	<0.03		
	2-methylphenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	2-nitrophenol	µg/l	10 (Primary): 1 (Interlab)	<10.0	<10.0	0	<10.0	<1.0	0
	3-&4-methylphenol	µg/l	6	<6.0	<6.0	0	<6.0		
	4,6-Dinitro-2-methylphenol	µg/l	30	<30.0	<30.0	0	<30.0		
	4-chloro-3-methylphenol	µg/l	10 (Primary): 1 (Interlab)	<10.0	<10.0	0	<10.0	<1.0	0
	4-nitrophenol	µg/l	30	<30.0	<30.0	0	<30.0		
	Acenaphthene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Acenaphthylene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Anthracene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Benzo(a)anthracene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Benzo(a)pyrene	µg/l	1 (Primary): 0.5 (Interlab)	<1.0	<1.0	0	<1.0	<0.5	0
	Benzo(g,h,i)perylene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Benzo(k)fluoranthene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Chrysene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Cresol Total	mg/l	0.01	<0.01	<0.01	0	<0.01		
	Dibenz(a,h)anthracene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Fluoranthene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Fluorene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Indeno(1,2,3-c,d)pyrene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
Phenolics	Naphthalene	µg/l	10 (Primary): 5 (Interlab)	<10.0	<10.0	0	<10.0	<1.0	0
	Naphthalene	µg/l	1 (Primary): 5 (Interlab)	<1.0	<1.0	0	<1.0	<1.0	0
	PAHs (Sum of total)	µg/l	1 (Primary): 0.5 (Interlab)	<1.0	<1.0	0	<1.0	<0.5	0
	Phenanthrene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Phenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	Pyrene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	4,6-Dinitro-o-cyclohexyl phenol	µg/l	100	<100.0	<100.0	0	<100.0		
	Phenols (Total Halogenated)	mg/l	0.01	<0.01	<0.01	0	<0.01		
	Phenols (Total Non Halogenated)	mg/l	0.1	<0.1	<0.1	0	<0.1		
TPH	C10-C16	mg/l	0.05 (Primary): 0.1 (Interlab)	<0.05	<0.05	0	<0.05	<0.1	0
	C16-C34	mg/l	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	C34-C40	mg/l	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	F2-NAPHTHALENE	mg/l	0.05 (Primary): 0.1 (Interlab)	<0.05	<0.05	0	<0.05	<0.1	0
	C6 - C9	µg/l	20	<20.0	<20.0	0	<20.0	<20.0	0
	C10 - C14	µg/l	50	<50.0	<50.0	0	<50.0	<50.0	0
	+C10 - C36 (Sum of total)	µg/l	100 (Primary): 50 (Interlab)	<100.0	<100.0	0	<100.0	<50.0	0
	C15 - C28	µg/l	100	<100.0	<100.0	0	<100.0	<100.0	0
	C29-C36	µg/l	100 (Primary): 50 (Interlab)	<100.0	<100.0	0	<100.0	<50.0	0
	C10 - C40 (Sum of total)	µg/l	100	<100.0	<100.0	0	<100.0	<100.0	0
	C6-C10	mg/l	0.02	<0.02	<0.02	0	<0.02	<0.02	0

Groundwater Monitoring Blank Results Tables

March 2022

J174436

			SDG Field ID Sampled_Date/Time Sample Type	28-Mar-22 RB01 25/03/2022 Rinsate	28-Mar-22 TB01 25/03/2022 Trip_B
Chem_Group	ChemName	Units	EQL		
BTEX	Benzene	µg/l	1	<1	<1
	Ethylbenzene	µg/l	1	<1	<1
	Toluene	µg/l	1	<1	<1
	Total BTEX	mg/l	0.001		
	Xylene (m & p)	µg/l	2	<2	<2
	Xylene (o)	µg/l	1	<1	<1
	Xylene Total	µg/l	2	<3	<3
	Naphthalene	µg/l	1	<10	<10
TPH	C10-C16	mg/l	0.05	<0.05	
	C16-C34	mg/l	0.1	<0.1	
	C34-C40	mg/l	0.1	<0.1	
	F2-NAPHTHALENE	mg/l	0.05	<0.05	
	C6 - C9	µg/L	20	<20	
	C6-C10 less BTEX (F1)	mg/l	0.02	<0.02	
	C10 - C14	µg/l	50	<50	
	+C10 - C36 (Sum of total)	µg/l	50	<100	
	C15 - C28	µg/l	100	<100	
	C29-C36	µg/l	50	<100	
	C10 - C40 (Sum of total)	µg/l	100	<100	
	C6-C10	mg/l	0.02	<0.02	



Groundwater Monitoring Event – March 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Appendix A: Environmental Protection Licence 229-01



Groundwater Monitoring Event – March 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Appendix B: Laboratory Certificates of Analysis



CHAIN OF CUSTODY RECORD

Eurofins | Environment Testing ABN 50 005 085 521



Sydney La
Unit F3 Bld.F
02 9900 840

Company		Greencap NT P/L		Project №	
Address		Unit 11 / 14 Winnellie Road Winnellie, NT 0820		Project Name	
Contact Name		Varun Bhagwat		Analyses Where metals are requested, please specify "Total" or "Filtered". SUITE code must be used to attract SUITE pricing. B11C; Cation Suite	
Phone №		0428 829 444			
Special Directions					
Purchase Order		PO299516			
Quote ID №					
No	Client Sample ID	Sampled Date/Time dd/mm/yy hh:mm	Matrix Solid (S) Water (W)		
1	EMB13	25/03/21	Water	X	
2	EMB14	25/03/21	Water	X	
	EMB7	25/03/21	Water	X	
	EMB12	25/03/21	Water	X	
	EMB15	25/03/21	Water	X	
3	QC01	25/03/21	Water		
4	RB01	25/03/21	Water		
5	TB01	25/03/21	Water		

	Add Rows		Total Counts		5
Method of Shipment	☐ Courier (#	)	☐ Hand Delivered		
Laboratory Use Only	Received By			SYD	
	Received By			SYD	

laboratory
16 Mars Road Lane Cove West NSW 2066
0 EnviroSampleNSW@eurofins.com

☐ Brisbane Laboratory
Unit 1 21 Smallwood Place Murarrie QLD 4172
07 3902 4600 EnviroSampleQLD@eurofins.com

☐ Perth Laboratory
Unit 2 91 Leach Highway
08 9251 9600 EnviroSa

J174436							Project Manager		Varun Bhagwat			
GME							EDD Format ESdat, EQuIS etc		Esdat	Facility Code		
B11E: Anion Suite	B19A: Nutrient Suite	Ammonia	PCB	PFAS	Total Cyanide	B4A: TRH/BTEXN/PAH/Phenols	BTEXN	TRH/BTEXN				
X	X	X	X	X	X	X						
X	X	X	X	X	X	X						
X	X	X	X	X	X	X						
X	X	X	X	X	X	X						
X	X	X	X	X	X	X						
						X						
								X				
							X					

5	5	5	5	5	5	6	1	1			
☐ Postal	Name							Signature			
BNE MEL PER ADL NTL DRW				Signature						Date	
BNE MEL PER ADL NTL DRW				Signature						Date	

Submission of samples to the laboratory will be deemed as acceptance of Eurofins | mgt Stande

	Sampler(s)		VB						
	Handed over by		VB on 26/3/22						
	Email for Invoice		Varun.Bhagwat@greencap.com.au						
	Email for Results		Varun.Bhagwat@greencap.com.au						
	Containers Change container type & size if necessary.							Required Turnaround Time (TAT) Default will be 5 days if not ticked.	
	500mL Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL VOA vial	500mL PFAS Bottle	Jar (Glass or HDPE)	Other (Asbestos AS4964, WA Guidelines)	◆ Surcharge will apply ☐ Overnight (reporting by 9am)◆ ☐ Same day◆ ☐ 1 day◆ ☐ 2 days◆ ☐ 3 days◆ ☒ 5 days (Standard) ☐ Other()
								Sample Comments / Dangerous Goods Hazard Warning	
1		2	2	2	1				
1		2	2	2	1				
1		2	2	2	1				
1		2	2	2	1				
1		2	2	2	1				
			1	2					
			1	2					
				2					

	5		10	12	16	5			
	Date								
	Time				Temperature				
	Time				Report №				

ard Terms and Conditions unless agreed otherwise. A copy of Eurofins | mgt Standard Terms and Conditions is available on request.

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6 Monterey Road
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Phone : +61 3 8564 5000
NATA # 1261 Site # 1254

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NATA # 2377 Site # 2370

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Penrose, Auckland 1061
Phone : +64 9 526 45 51
IANZ # 1327

Christchurch
43 Detroit Drive
Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Sample Receipt Advice

Company name: Greencap NT P/L
Contact name: Varun
Project name: GME
Project ID: Not provided
Turnaround time: 5 Day
Date/Time received: Mar 28, 2022 9:00 AM
Eurofins reference: 874851

Sample Information

- ✓ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ✓ All samples have been received as described on the above COC.
- ✓ COC has been completed correctly.
- ✗ Attempt to chill was evident.
- ✓ Appropriately preserved sample containers have been used.
- ✓ All samples were received in good condition.
- ✓ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ✓ Appropriate sample containers have been used.
- ✓ Sample containers for volatile analysis received with zero headspace.
- ✗ Split sample sent to requested external lab.
- ✗ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Notes

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Michael Morrison on phone : 03 8564 5933 or by email: MichaelMorrison@eurofins.com

Results will be delivered electronically via email to Varun - varun.bhagwat@greencap.com.au.

Note: A copy of these results will also be delivered to the general Greencap NT P/L email address.

Greencap NT P/L
11/14 Winnellie Road
Winnellie
NT 0800



NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention: Varun

Report 874851-W-V2
Project name GME
Received Date Mar 28, 2022

Client Sample ID			EMB13	EMB14	EMB7	EMB12
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			M22-Ma57122	M22-Ma57123	M22-Ma57124	M22-Ma57125
Date Sampled			Mar 25, 2022	Mar 25, 2022	Mar 25, 2022	Mar 25, 2022
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Naphthalene ^{N02}	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2) ^{N01}	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	66	71	71	76
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene ^{N07}	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1,2,3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001

Client Sample ID			EMB13 Water M22-Ma57122 Mar 25, 2022	EMB14 Water M22-Ma57123 Mar 25, 2022	EMB7 Water M22-Ma57124 Mar 25, 2022	EMB12 Water M22-Ma57125 Mar 25, 2022
Sample Matrix						
Eurofins Sample No.						
Date Sampled						
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	104	76	79	107
p-Terphenyl-d14 (surr.)	1	%	140	78	110	131
Polychlorinated Biphenyls						
Aroclor-1016	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Aroclor-1221	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Aroclor-1232	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Aroclor-1242	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Aroclor-1248	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Aroclor-1254	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Aroclor-1260	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Total PCB*	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Dibutylchloroendate (surr.)	1	%	80	71	62	95
Tetrachloro-m-xylene (surr.)	1	%	93	115	146	100
Phenols (Halogenated)						
2-Chlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
2,4-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
2,4,5-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
2,4,6-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
2,6-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Pentachlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Tetrachlorophenols - Total	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
Total Halogenated Phenol*	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Phenols (non-Halogenated)						
2-Cyclohexyl-4,6-dinitrophenol	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
2-Methyl-4,6-dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
2-Nitrophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
2,4-Dimethylphenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
2,4-Dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006	< 0.006	< 0.006	< 0.006
Total cresols*	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
4-Nitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
Dinoseb	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Phenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
Phenol-d6 (surr.)	1	%	77	37	44	73
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Ammonia (as N)	0.01	mg/L	0.08	0.06	1.0	0.10
Chloride	1	mg/L	41	4.6	42	9.2
Cyanide (total)	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Nitrate & Nitrite (as N)	0.05	mg/L	4.7	5.8	1.2	0.33
Phosphate total (as P)	0.01	mg/L	0.03	0.03	0.04	0.02
Sulphate (as SO4)	5	mg/L	16	23	30	6.1
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	0.4	2.3	1.0	< 0.2
Total Nitrogen (as N)*	0.2	mg/L	5.1	8.1	2.2	0.33

Client Sample ID			EMB13 Water M22-Ma57122 Mar 25, 2022	EMB14 Water M22-Ma57123 Mar 25, 2022	EMB7 Water M22-Ma57124 Mar 25, 2022	EMB12 Water M22-Ma57125 Mar 25, 2022
Sample Matrix						
Eurofins Sample No.						
Date Sampled						
Test/Reference	LOR	Unit				
Alkalinity (speciated)						
Bicarbonate Alkalinity (as CaCO ₃)	20	mg/L	< 20	41	150	98
Carbonate Alkalinity (as CaCO ₃)	10	mg/L	< 10	< 10	< 10	< 10
Hydroxide Alkalinity (as CaCO ₃)	20	mg/L	< 20	< 20	< 20	< 20
Total Alkalinity (as CaCO ₃)	20	mg/L	< 20	41	150	98
Alkali Metals						
Calcium	0.5	mg/L	2.0	17	8.8	8.3
Magnesium	0.5	mg/L	0.7	1.5	0.9	1.0
Potassium	0.5	mg/L	1.3	2.9	2.0	6.2
Sodium	0.5	mg/L	21	3.2	22	6.6
Perfluoroalkyl carboxylic acids (PFCAs)						
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	2.1	0.18	1.9	0.09
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	12	0.28	5.3	^{N09} 0.06
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	11	0.19	12	^{N09} 0.04
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.01	ug/L	3.4	0.21	1.3	^{N09} 0.03
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	2.2	0.08	3.0	< 0.01
Perfluorononanoic acid (PFNA) ^{N11}	0.01	ug/L	0.06	0.08	0.03	< 0.01
Perfluorodecanoic acid (PFDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluoroundecanoic acid (PFUnDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorododecanoic acid (PFDoDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorotridecanoic acid (PFTeDA) ^{N15}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
13C4-PFBA (surr.)	1	%	85	97	86	106
13C5-PFPeA (surr.)	1	%	89	113	89	118
13C5-PFHxA (surr.)	1	%	93	105	90	111
13C4-PFHpA (surr.)	1	%	95	98	99	110
13C8-PFOA (surr.)	1	%	91	99	90	105
13C5-PFNA (surr.)	1	%	90	93	101	107
13C6-PFDA (surr.)	1	%	98	106	105	112
13C2-PFUnDA (surr.)	1	%	76	89	85	108
13C2-PFDoDA (surr.)	1	%	72	77	72	82
13C2-PFTeDA (surr.)	1	%	24	32	28	45
Perfluoroalkyl sulfonamido substances						
Perfluorooctane sulfonamide (FOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
13C8-FOSA (surr.)	1	%	67	93	74	106
D3-N-MeFOSA (surr.)	1	%	39	73	59	80
D5-N-EtFOSA (surr.)	1	%	33	66	51	71
D7-N-MeFOSE (surr.)	1	%	72	109	87	95
D9-N-EtFOSE (surr.)	1	%	63	92	79	92
D5-N-EtFOSAA (surr.)	1	%	47	61	58	77
D3-N-MeFOSAA (surr.)	1	%	48	63	70	91

Client Sample ID			EMB13 Water M22-Ma57122 Mar 25, 2022	EMB14 Water M22-Ma57123 Mar 25, 2022	EMB7 Water M22-Ma57124 Mar 25, 2022	EMB12 Water M22-Ma57125 Mar 25, 2022
Sample Matrix						
Eurofins Sample No.						
Date Sampled						
Test/Reference	LOR	Unit				
Perfluoroalkyl sulfonic acids (PFASs)						
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorononanesulfonic acid (PFNS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluoropropanesulfonic acid (PFPrS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
13C3-PFBS (surr.)	1	%	72	109	69	116
18O2-PFHxS (surr.)	1	%	105	99	58	107
13C8-PFOS (surr.)	1	%	72	82	76	79
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)						
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	0.01	ug/L	0.10	< 0.01	0.40	< 0.01
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA) ^{N11}	0.05	ug/L	16	< 0.05	16	< 0.05
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	0.01	ug/L	0.70	< 0.01	0.14	< 0.01
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
13C2-4:2 FTSA (surr.)	1	%	74	61	85	67
13C2-6:2 FTSA (surr.)	1	%	94	79	80	99
13C2-8:2 FTSA (surr.)	1	%	119	105	124	144
13C2-10:2 FTSA (surr.)	1	%	34	38	46	75
PFASs Summations						
Sum (PFHxS + PFOS)*	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	2.2	0.08	3	< 0.01
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	2.2	0.08	3	< 0.01
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	47.4	0.94	39.64	0.22
Sum of PFASs (n=30)*	0.1	ug/L	47.56	1.02	40.07	0.22

Client Sample ID			EMB15 Water M22-Ma57126 Mar 25, 2022	QC01 Water M22-Ma57127 Mar 25, 2022	RB01 Water M22-Ma57128 Mar 25, 2022	TB01 Water M22-Ma57129 Mar 25, 2022
Sample Matrix						
Eurofins Sample No.						
Date Sampled						
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	-
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	-
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
Naphthalene ^{N02}	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	-
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	< 0.02	< 0.02	< 0.02	-
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	-
TRH >C10-C16 less Naphthalene (F2) ^{N01}	0.05	mg/L	< 0.05	< 0.05	< 0.05	-
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	-

Client Sample ID			EMB15	QC01	RB01	TB01
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			M22-Ma57126	M22-Ma57127	M22-Ma57128	M22-Ma57129
Date Sampled			Mar 25, 2022	Mar 25, 2022	Mar 25, 2022	Mar 25, 2022
Test/Reference	LOR	Unit				
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	74	74	75	76
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	-	-
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	-	-
Anthracene	0.001	mg/L	< 0.001	< 0.001	-	-
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	-	-
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	-	-
Benzo(b&j)fluoranthene ^{N07}	0.001	mg/L	< 0.001	< 0.001	-	-
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001	< 0.001	-	-
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	-	-
Chrysene	0.001	mg/L	< 0.001	< 0.001	-	-
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001	< 0.001	-	-
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	-	-
Fluorene	0.001	mg/L	< 0.001	< 0.001	-	-
Indeno(1,2,3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	-	-
Naphthalene	0.001	mg/L	< 0.001	< 0.001	-	-
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	-	-
Pyrene	0.001	mg/L	< 0.001	< 0.001	-	-
Total PAH*	0.001	mg/L	< 0.001	< 0.001	-	-
2-Fluorobiphenyl (surr.)	1	%	117	102	-	-
p-Terphenyl-d14 (surr.)	1	%	143	112	-	-
Polychlorinated Biphenyls						
Aroclor-1016	0.005	mg/L	< 0.005	-	-	-
Aroclor-1221	0.005	mg/L	< 0.005	-	-	-
Aroclor-1232	0.005	mg/L	< 0.005	-	-	-
Aroclor-1242	0.005	mg/L	< 0.005	-	-	-
Aroclor-1248	0.005	mg/L	< 0.005	-	-	-
Aroclor-1254	0.005	mg/L	< 0.005	-	-	-
Aroclor-1260	0.005	mg/L	< 0.005	-	-	-
Total PCB*	0.005	mg/L	< 0.005	-	-	-
Dibutylchloroendate (surr.)	1	%	88	-	-	-
Tetrachloro-m-xylene (surr.)	1	%	96	-	-	-
Phenols (Halogenated)						
2-Chlorophenol	0.003	mg/L	< 0.003	< 0.003	-	-
2,4-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	-	-
2,4,5-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	-	-
2,4,6-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	-	-
2,6-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	-	-
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01	< 0.01	-	-
Pentachlorophenol	0.01	mg/L	< 0.01	< 0.01	-	-
Tetrachlorophenols - Total	0.03	mg/L	< 0.03	< 0.03	-	-
Total Halogenated Phenol*	0.01	mg/L	< 0.01	< 0.01	-	-

Client Sample ID			EMB15	QC01	RB01	TB01
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			M22-Ma57126	M22-Ma57127	M22-Ma57128	M22-Ma57129
Date Sampled			Mar 25, 2022	Mar 25, 2022	Mar 25, 2022	Mar 25, 2022
Test/Reference	LOR	Unit				
Phenols (non-Halogenated)						
2-Cyclohexyl-4,6-dinitrophenol	0.1	mg/L	< 0.1	< 0.1	-	-
2-Methyl-4,6-dinitrophenol	0.03	mg/L	< 0.03	< 0.03	-	-
2-Nitrophenol	0.01	mg/L	< 0.01	< 0.01	-	-
2,4-Dimethylphenol	0.003	mg/L	< 0.003	< 0.003	-	-
2,4-Dinitrophenol	0.03	mg/L	< 0.03	< 0.03	-	-
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003	< 0.003	-	-
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006	< 0.006	-	-
Total cresols*	0.01	mg/L	< 0.01	< 0.01	-	-
4-Nitrophenol	0.03	mg/L	< 0.03	< 0.03	-	-
Dinoseb	0.1	mg/L	< 0.1	< 0.1	-	-
Phenol	0.003	mg/L	< 0.003	< 0.003	-	-
Phenol-d6 (surr.)	1	%	87	67	-	-
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1	< 0.1	-	-
Ammonia (as N)	0.01	mg/L	0.07	-	-	-
Chloride	1	mg/L	380	-	-	-
Cyanide (total)	0.005	mg/L	< 0.005	-	-	-
Nitrate & Nitrite (as N)	0.05	mg/L	1.3	-	-	-
Phosphate total (as P)	0.01	mg/L	0.06	-	-	-
Sulphate (as SO4)	5	mg/L	61	-	-	-
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	0.2	-	-	-
Total Nitrogen (as N)*	0.2	mg/L	1.5	-	-	-
Alkalinity (speciated)						
Bicarbonate Alkalinity (as CaCO3)	20	mg/L	< 20	-	-	-
Carbonate Alkalinity (as CaCO3)	10	mg/L	< 10	-	-	-
Hydroxide Alkalinity (as CaCO3)	20	mg/L	< 20	-	-	-
Total Alkalinity (as CaCO3)	20	mg/L	< 20	-	-	-
Alkali Metals						
Calcium	0.5	mg/L	12	-	-	-
Magnesium	0.5	mg/L	21	-	-	-
Potassium	0.5	mg/L	1.4	-	-	-
Sodium	0.5	mg/L	240	-	-	-
Perfluoroalkyl carboxylic acids (PFCAs)						
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	0.09	-	-	-
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	^{N09} 0.10	-	-	-
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	^{N09} 0.06	-	-	-
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.01	ug/L	^{N09} 0.05	-	-	-
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	< 0.01	-	-	-
Perfluorononanoic acid (PFNA) ^{N11}	0.01	ug/L	< 0.01	-	-	-
Perfluorodecanoic acid (PFDA) ^{N11}	0.01	ug/L	< 0.01	-	-	-
Perfluoroundecanoic acid (PFUnDA) ^{N11}	0.01	ug/L	< 0.01	-	-	-
Perfluorododecanoic acid (PFDoDA) ^{N11}	0.01	ug/L	< 0.01	-	-	-
Perfluorotridecanoic acid (PFTTrDA) ^{N15}	0.01	ug/L	< 0.01	-	-	-
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	0.01	ug/L	< 0.01	-	-	-
13C4-PFBA (surr.)	1	%	121	-	-	-
13C5-PFPeA (surr.)	1	%	130	-	-	-
13C5-PFHxA (surr.)	1	%	129	-	-	-
13C4-PFHpA (surr.)	1	%	122	-	-	-
13C8-PFOA (surr.)	1	%	116	-	-	-

Client Sample ID			EMB15	QC01	RB01	TB01
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			M22-Ma57126	M22-Ma57127	M22-Ma57128	M22-Ma57129
Date Sampled			Mar 25, 2022	Mar 25, 2022	Mar 25, 2022	Mar 25, 2022
Test/Reference	LOR	Unit				
Perfluoroalkyl carboxylic acids (PFCAs)						
13C5-PFNA (surr.)	1	%	103	-	-	-
13C6-PFDA (surr.)	1	%	102	-	-	-
13C2-PFUnDA (surr.)	1	%	84	-	-	-
13C2-PFDoDA (surr.)	1	%	77	-	-	-
13C2-PFTeDA (surr.)	1	%	44	-	-	-
Perfluoroalkyl sulfonamido substances						
Perfluorooctane sulfonamide (FOSA) ^{N11}	0.05	ug/L	< 0.05	-	-	-
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	0.05	ug/L	< 0.05	-	-	-
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	0.05	ug/L	< 0.05	-	-	-
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE) ^{N11}	0.05	ug/L	< 0.05	-	-	-
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE) ^{N11}	0.05	ug/L	< 0.05	-	-	-
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	0.05	ug/L	< 0.05	-	-	-
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	0.05	ug/L	< 0.05	-	-	-
13C8-FOSA (surr.)	1	%	71	-	-	-
D3-N-MeFOSA (surr.)	1	%	50	-	-	-
D5-N-EtFOSA (surr.)	1	%	40	-	-	-
D7-N-MeFOSE (surr.)	1	%	93	-	-	-
D9-N-EtFOSE (surr.)	1	%	68	-	-	-
D5-N-EtFOSAA (surr.)	1	%	45	-	-	-
D3-N-MeFOSAA (surr.)	1	%	52	-	-	-
Perfluoroalkyl sulfonic acids (PFSAs)						
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	< 0.01	-	-	-
Perfluorononanesulfonic acid (PFNS) ^{N15}	0.01	ug/L	< 0.01	-	-	-
Perfluoropropanesulfonic acid (PFPrS) ^{N15}	0.01	ug/L	< 0.01	-	-	-
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.01	ug/L	< 0.01	-	-	-
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	< 0.01	-	-	-
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	< 0.01	-	-	-
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	< 0.01	-	-	-
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 0.01	-	-	-
13C3-PFBS (surr.)	1	%	128	-	-	-
18O2-PFHxS (surr.)	1	%	115	-	-	-
13C8-PFOS (surr.)	1	%	73	-	-	-
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)						
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	-	-	-
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA) ^{N11}	0.05	ug/L	< 0.05	-	-	-
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	-	-	-
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	-	-	-
13C2-4:2 FTSA (surr.)	1	%	79	-	-	-
13C2-6:2 FTSA (surr.)	1	%	120	-	-	-
13C2-8:2 FTSA (surr.)	1	%	144	-	-	-
13C2-10:2 FTSA (surr.)	1	%	45	-	-	-

Client Sample ID			EMB15	QC01	RB01	TB01
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			M22-Ma57126	M22-Ma57127	M22-Ma57128	M22-Ma57129
Date Sampled			Mar 25, 2022	Mar 25, 2022	Mar 25, 2022	Mar 25, 2022
Test/Reference	LOR	Unit				
PFASs Summations						
Sum (PFHxS + PFOS)*	0.01	ug/L	< 0.01	-	-	-
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	< 0.01	-	-	-
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	< 0.01	-	-	-
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	0.3	-	-	-
Sum of PFASs (n=30)*	0.1	ug/L	0.3	-	-	-

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B4A			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Apr 11, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Apr 01, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Apr 11, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	Apr 01, 2022	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
Polycyclic Aromatic Hydrocarbons	Melbourne	Apr 01, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (Halogenated)	Melbourne	Apr 01, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (non-Halogenated)	Melbourne	Apr 01, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Polychlorinated Biphenyls	Melbourne	Apr 01, 2022	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8082)			
Ammonia (as N)	Melbourne	Apr 01, 2022	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Cyanide (total)	Melbourne	Apr 01, 2022	14 Days
- Method: LTM-INO-4020 Total Free WAD Cyanide by CFA			
Eurofins Suite B11C: Na/K/Ca/Mg	Melbourne	Apr 01, 2022	180 Days
- Method: LTM-MET-3010 Alkali Metals by ICP-AES			
Eurofins Suite B11E: Cl/SO4/Alkalinity			
Chloride	Melbourne	Apr 01, 2022	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
Sulphate (as SO4)	Melbourne	Apr 01, 2022	28 Days
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
Alkalinity (speciated)	Melbourne	Apr 01, 2022	14 Days
- Method: LTM-INO-4250 Alkalinity by Electrometric Titration			
Total Nitrogen Set (as N)			
Nitrate & Nitrite (as N)	Melbourne	Apr 01, 2022	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Total Kjeldahl Nitrogen (as N)	Melbourne	Apr 01, 2022	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Eurofins Suite B19A: Total N (TKN, NOx), Total P			
Phosphate total (as P)	Melbourne	Apr 01, 2022	28 Days
- Method: LTM-INO-4040 Phosphate by CFA			
Per- and Polyfluoroalkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs)	Melbourne	Apr 01, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Melbourne	Apr 01, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFASs)	Melbourne	Apr 01, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Melbourne	Apr 01, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
PFASs Summations	Melbourne	Mar 28, 2022	
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

Company Name: Greencap NT P/L
Address: 11/14 Winnellie Road
Winnellie
NT 0800

Order No.: PO299516
Report #: 874851
Phone: 61 8 8984 4244
Fax: 61 8 8984 3105

Received: Mar 28, 2022 9:00 AM
Due: Apr 4, 2022
Priority: 5 Day
Contact Name: Varun

Project Name: GME

Eurofins Analytical Services Manager : Michael Morrison

Sample Detail						Ammonia (as N)	Cyanide (total)	Polychlorinated Biphenyls	BTEX and Naphthalene	Total Recoverable Hydrocarbons	Eurofins Suite B4A	Eurofins Suite B19A: Total N (TKN, NOx), Total P	Eurofins Suite B11E: Cl/SO4/Alkalinity	Per- and Polyfluoroalkyl Substances (PFASs)	Eurofins Suite B11C: Na/K/Ca/Mg
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA # 1261 Site # 18217															
Brisbane Laboratory - NATA # 1261 Site # 20794															
Mayfield Laboratory - NATA # 1261 Site # 25079															
Perth Laboratory - NATA # 2377 Site # 2370															
External Laboratory															
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID										
1	EMB13	Mar 25, 2022		Water	M22-Ma57122	X	X	X			X	X	X	X	X
2	EMB14	Mar 25, 2022		Water	M22-Ma57123	X	X	X			X	X	X	X	X
3	EMB7	Mar 25, 2022		Water	M22-Ma57124	X	X	X			X	X	X	X	X
4	EMB12	Mar 25, 2022		Water	M22-Ma57125	X	X	X			X	X	X	X	X
5	EMB15	Mar 25, 2022		Water	M22-Ma57126	X	X	X			X	X	X	X	X
6	QC01	Mar 25, 2022		Water	M22-Ma57127						X				
7	RB01	Mar 25, 2022		Water	M22-Ma57128				X	X					
8	TB01	Mar 25, 2022		Water	M22-Ma57129				X						
Test Counts						5	5	5	2	1	6	5	5	5	5

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	µg/L: micrograms per litre
ppm: parts per million	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
Naphthalene	mg/L	< 0.01			0.01	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total*	mg/L	< 0.003			0.003	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/L	< 0.001			0.001	Pass	
Acenaphthylene	mg/L	< 0.001			0.001	Pass	
Anthracene	mg/L	< 0.001			0.001	Pass	
Benz(a)anthracene	mg/L	< 0.001			0.001	Pass	
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.001			0.001	Pass	
Benzo(g,h,i)perylene	mg/L	< 0.001			0.001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.001			0.001	Pass	
Chrysene	mg/L	< 0.001			0.001	Pass	
Dibenz(a,h)anthracene	mg/L	< 0.001			0.001	Pass	
Fluoranthene	mg/L	< 0.001			0.001	Pass	
Fluorene	mg/L	< 0.001			0.001	Pass	
Indeno(1,2,3-cd)pyrene	mg/L	< 0.001			0.001	Pass	
Naphthalene	mg/L	< 0.001			0.001	Pass	
Phenanthrene	mg/L	< 0.001			0.001	Pass	
Pyrene	mg/L	< 0.001			0.001	Pass	
Method Blank							
Polychlorinated Biphenyls							
Aroclor-1016	mg/L	< 0.005			0.005	Pass	
Aroclor-1221	mg/L	< 0.005			0.005	Pass	
Aroclor-1232	mg/L	< 0.005			0.005	Pass	
Aroclor-1242	mg/L	< 0.005			0.005	Pass	
Aroclor-1248	mg/L	< 0.005			0.005	Pass	
Aroclor-1254	mg/L	< 0.005			0.005	Pass	
Aroclor-1260	mg/L	< 0.005			0.005	Pass	
Total PCB*	mg/L	< 0.005			0.005	Pass	
Method Blank							
Phenols (Halogenated)							
2-Chlorophenol	mg/L	< 0.003			0.003	Pass	
2,4-Dichlorophenol	mg/L	< 0.003			0.003	Pass	
2,4,5-Trichlorophenol	mg/L	< 0.01			0.01	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
2,4,6-Trichlorophenol	mg/L	< 0.01			0.01	Pass	
2,6-Dichlorophenol	mg/L	< 0.003			0.003	Pass	
4-Chloro-3-methylphenol	mg/L	< 0.01			0.01	Pass	
Pentachlorophenol	mg/L	< 0.01			0.01	Pass	
Tetrachlorophenols - Total	mg/L	< 0.03			0.03	Pass	
Method Blank							
Phenols (non-Halogenated)							
2-Cyclohexyl-4,6-dinitrophenol	mg/L	< 0.1			0.1	Pass	
2-Methyl-4,6-dinitrophenol	mg/L	< 0.03			0.03	Pass	
2-Nitrophenol	mg/L	< 0.01			0.01	Pass	
2,4-Dimethylphenol	mg/L	< 0.003			0.003	Pass	
2,4-Dinitrophenol	mg/L	< 0.03			0.03	Pass	
2-Methylphenol (o-Cresol)	mg/L	< 0.003			0.003	Pass	
3&4-Methylphenol (m&p-Cresol)	mg/L	< 0.006			0.006	Pass	
4-Nitrophenol	mg/L	< 0.03			0.03	Pass	
Dinoseb	mg/L	< 0.1			0.1	Pass	
Phenol	mg/L	< 0.003			0.003	Pass	
Method Blank							
Ammonia (as N)	mg/L	< 0.01			0.01	Pass	
Chloride	mg/L	< 1			1	Pass	
Cyanide (total)	mg/L	< 0.005			0.005	Pass	
Nitrate & Nitrite (as N)	mg/L	< 0.05			0.05	Pass	
Phosphate total (as P)	mg/L	< 0.01			0.01	Pass	
Sulphate (as SO ₄)	mg/L	< 5			5	Pass	
Total Kjeldahl Nitrogen (as N)	mg/L	< 0.2			0.2	Pass	
Method Blank							
Alkalinity (speciated)							
Bicarbonate Alkalinity (as CaCO ₃)	mg/L	< 20			20	Pass	
Carbonate Alkalinity (as CaCO ₃)	mg/L	< 10			10	Pass	
Hydroxide Alkalinity (as CaCO ₃)	mg/L	< 20			20	Pass	
Total Alkalinity (as CaCO ₃)	mg/L	< 20			20	Pass	
Method Blank							
Alkali Metals							
Calcium	mg/L	< 0.5			0.5	Pass	
Magnesium	mg/L	< 0.5			0.5	Pass	
Potassium	mg/L	< 0.5			0.5	Pass	
Sodium	mg/L	< 0.5			0.5	Pass	
Method Blank							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	ug/L	< 0.05			0.05	Pass	
Perfluoropentanoic acid (PFPeA)	ug/L	< 0.01			0.01	Pass	
Perfluorohexanoic acid (PFHxA)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanoic acid (PFHpA)	ug/L	< 0.01			0.01	Pass	
Perfluorooctanoic acid (PFOA)	ug/L	< 0.01			0.01	Pass	
Perfluorononanoic acid (PFNA)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanoic acid (PFDA)	ug/L	< 0.01			0.01	Pass	
Perfluoroundecanoic acid (PFUnDA)	ug/L	< 0.01			0.01	Pass	
Perfluorododecanoic acid (PFDoDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotridecanoic acid (PFTeDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotetradecanoic acid (PFTeDA)	ug/L	< 0.01			0.01	Pass	
Method Blank							
Perfluoroalkyl sulfonamido substances							
Perfluorooctane sulfonamide (FOSA)	ug/L	< 0.05			0.05	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	ug/L	< 0.05			0.05	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	ug/L	< 0.05			0.05	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	ug/L	< 0.05			0.05	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	ug/L	< 0.05			0.05	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	ug/L	< 0.05			0.05	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	ug/L	< 0.05			0.05	Pass	
Method Blank							
Perfluoroalkyl sulfonic acids (PFSA's)							
Perfluorobutanesulfonic acid (PFBS)	ug/L	< 0.01			0.01	Pass	
Perfluorononanesulfonic acid (PFNS)	ug/L	< 0.01			0.01	Pass	
Perfluoropropanesulfonic acid (PFPrS)	ug/L	< 0.01			0.01	Pass	
Perfluoropentanesulfonic acid (PFPeS)	ug/L	< 0.01			0.01	Pass	
Perfluorohexanesulfonic acid (PFHxS)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	ug/L	< 0.01			0.01	Pass	
Perfluorooctanesulfonic acid (PFOS)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanesulfonic acid (PFDS)	ug/L	< 0.01			0.01	Pass	
Method Blank							
n:2 Fluorotelomer sulfonic acids (n:2 FTSA's)							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	ug/L	< 0.05			0.05	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	ug/L	< 0.01			0.01	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons							
TRH C6-C9	%	88			70-130	Pass	
TRH C10-C14	%	102			70-130	Pass	
Naphthalene	%	101			70-130	Pass	
TRH C6-C10	%	89			70-130	Pass	
TRH >C10-C16	%	96			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	104			70-130	Pass	
Toluene	%	92			70-130	Pass	
Ethylbenzene	%	89			70-130	Pass	
m&p-Xylenes	%	87			70-130	Pass	
Xylenes - Total*	%	85			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	104			70-130	Pass	
Acenaphthylene	%	88			70-130	Pass	
Anthracene	%	108			70-130	Pass	
Benz(a)anthracene	%	103			70-130	Pass	
Benzo(a)pyrene	%	80			70-130	Pass	
Benzo(b&j)fluoranthene	%	105			70-130	Pass	
Benzo(g,h,i)perylene	%	100			70-130	Pass	
Benzo(k)fluoranthene	%	89			70-130	Pass	
Chrysene	%	93			70-130	Pass	
Dibenz(a,h)anthracene	%	72			70-130	Pass	
Fluoranthene	%	90			70-130	Pass	
Fluorene	%	98			70-130	Pass	
Indeno(1,2,3-cd)pyrene	%	80			70-130	Pass	
Naphthalene	%	85			70-130	Pass	
Phenanthrene	%	96			70-130	Pass	
Pyrene	%	74			70-130	Pass	
LCS - % Recovery							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Polychlorinated Biphenyls							
Aroclor-1260	%	100			70-130	Pass	
LCS - % Recovery							
Phenols (Halogenated)							
2-Chlorophenol	%	65			25-140	Pass	
2,4-Dichlorophenol	%	58			25-140	Pass	
2,4,5-Trichlorophenol	%	52			25-140	Pass	
2,4,6-Trichlorophenol	%	50			25-140	Pass	
2,6-Dichlorophenol	%	50			25-140	Pass	
4-Chloro-3-methylphenol	%	63			25-140	Pass	
Pentachlorophenol	%	82			25-140	Pass	
Tetrachlorophenols - Total	%	50			25-140	Pass	
LCS - % Recovery							
Phenols (non-Halogenated)							
2-Cyclohexyl-4,6-dinitrophenol	%	60			25-140	Pass	
2-Methyl-4,6-dinitrophenol	%	52			25-140	Pass	
2-Nitrophenol	%	52			25-140	Pass	
2,4-Dimethylphenol	%	34			25-140	Pass	
2,4-Dinitrophenol	%	51			25-140	Pass	
2-Methylphenol (o-Cresol)	%	36			25-140	Pass	
3&4-Methylphenol (m&p-Cresol)	%	35			25-140	Pass	
4-Nitrophenol	%	57			25-140	Pass	
Dinoseb	%	59			25-140	Pass	
Phenol	%	53			25-140	Pass	
LCS - % Recovery							
Ammonia (as N)	%	78			70-130	Pass	
Chloride	%	100			70-130	Pass	
Cyanide (total)	%	110			70-130	Pass	
Nitrate & Nitrite (as N)	%	82			70-130	Pass	
Phosphate total (as P)	%	105			70-130	Pass	
Sulphate (as SO4)	%	107			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	%	81			70-130	Pass	
LCS - % Recovery							
Alkalinity (speciated)							
Carbonate Alkalinity (as CaCO3)	%	97			70-130	Pass	
Total Alkalinity (as CaCO3)	%	100			70-130	Pass	
LCS - % Recovery							
Alkali Metals							
Calcium	%	106			80-120	Pass	
Magnesium	%	103			80-120	Pass	
Potassium	%	96			80-120	Pass	
Sodium	%	104			80-120	Pass	
LCS - % Recovery							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	%	88			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	110			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	97			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	86			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	94			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	87			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	98			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	100			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	94			50-150	Pass	
Perfluorotridecanoic acid (PFTTrDA)	%	99			50-150	Pass	

Test				Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Perfluorotetradecanoic acid (PFTeDA)				%	99			50-150	Pass	
LCS - % Recovery										
Perfluoroalkyl sulfonamido substances										
Perfluorooctane sulfonamide (FOSA)				%	125			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)				%	118			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)				%	81			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)				%	78			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)				%	95			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)				%	85			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)				%	84			50-150	Pass	
LCS - % Recovery										
Perfluoroalkyl sulfonic acids (PFSA's)										
Perfluorobutanesulfonic acid (PFBS)				%	94			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)				%	85			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)				%	98			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)				%	94			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)				%	94			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)				%	93			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)				%	92			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)				%	78			50-150	Pass	
LCS - % Recovery										
n:2 Fluorotelomer sulfonic acids (n:2 FTSA's)										
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)				%	120			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)				%	131			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)				%	96			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)				%	89			50-150	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1				Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery										
Total Recoverable Hydrocarbons					Result 1					
TRH C6-C9	M22-Ma67651	NCP	%	82				70-130	Pass	
TRH C10-C14	M22-Ap0002248	NCP	%	109				70-130	Pass	
Naphthalene	M22-Ma67651	NCP	%	105				70-130	Pass	
TRH C6-C10	M22-Ma67651	NCP	%	81				70-130	Pass	
TRH >C10-C16	M22-Ap0002248	NCP	%	116				70-130	Pass	
Spike - % Recovery										
BTEX					Result 1					
Benzene	M22-Ma67651	NCP	%	96				70-130	Pass	
Toluene	M22-Ma67651	NCP	%	81				70-130	Pass	
Ethylbenzene	M22-Ma67651	NCP	%	72				70-130	Pass	
m&p-Xylenes	M22-Ma67651	NCP	%	71				70-130	Pass	
o-Xylene	M22-Ma67651	NCP	%	72				70-130	Pass	
Xylenes - Total*	M22-Ma67651	NCP	%	71				70-130	Pass	
Spike - % Recovery										
					Result 1					
Total Kjeldahl Nitrogen (as N)	M22-Ap0007242	NCP	%	75				70-130	Pass	
Spike - % Recovery										
Alkali Metals					Result 1					
Calcium	B22-Ma57803	NCP	%	81				75-125	Pass	
Magnesium	M22-Ma60847	NCP	%	123				75-125	Pass	
Potassium	M22-Ma60847	NCP	%	116				75-125	Pass	
Spike - % Recovery										
Perfluoroalkyl carboxylic acids (PFCAs)					Result 1					
Perfluorobutanoic acid (PFBA)	M22-Ma67305	NCP	%	112				50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Perfluoropentanoic acid (PFPeA)	M22-Ma67305	NCP	%	93			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	M22-Ma67305	NCP	%	103			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	M22-Ma67305	NCP	%	95			50-150	Pass	
Perfluorooctanoic acid (PFOA)	M22-Ma67305	NCP	%	101			50-150	Pass	
Perfluorononanoic acid (PFNA)	M22-Ma67305	NCP	%	95			50-150	Pass	
Perfluorodecanoic acid (PFDA)	M22-Ma67305	NCP	%	104			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	M22-Ma67305	NCP	%	107			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	M22-Ma67305	NCP	%	119			50-150	Pass	
Perfluorotridecanoic acid (PFTTrDA)	M22-Ma67305	NCP	%	183			50-150	Fail	Q08
Perfluorotetradecanoic acid (PFTeDA)	M22-Ma67305	NCP	%	100			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances				Result 1					
Perfluorooctane sulfonamide (FOSA)	M22-Ma67305	NCP	%	113			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M22-Ma67305	NCP	%	106			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M22-Ma67305	NCP	%	115			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	M22-Ma67305	NCP	%	104			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	M22-Ma67305	NCP	%	113			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M22-Ma67305	NCP	%	92			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M22-Ma67305	NCP	%	101			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1					
Perfluorobutanesulfonic acid (PFBS)	M22-Ma67305	NCP	%	92			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	M22-Ma67305	NCP	%	103			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M22-Ma67305	NCP	%	102			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M22-Ma67305	NCP	%	105			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M22-Ma67305	NCP	%	104			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M22-Ma67305	NCP	%	109			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	M22-Ma67305	NCP	%	104			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	M22-Ma67305	NCP	%	77			50-150	Pass	
Spike - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)				Result 1					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M22-Ma67305	NCP	%	119			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	M22-Ma67305	NCP	%	138			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M22-Ma67305	NCP	%	115			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M22-Ma67305	NCP	%	100			50-150	Pass	
Spike - % Recovery									

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	W22-Ma59698	NCP	%	80			70-130	Pass	
Acenaphthylene	W22-Ma59698	NCP	%	106			70-130	Pass	
Anthracene	W22-Ma59698	NCP	%	89			70-130	Pass	
Benz(a)anthracene	W22-Ma59698	NCP	%	90			70-130	Pass	
Benzo(b&j)fluoranthene	W22-Ma59698	NCP	%	112			70-130	Pass	
Benzo(g,h,i)perylene	W22-Ma59698	NCP	%	98			70-130	Pass	
Benzo(k)fluoranthene	W22-Ma59698	NCP	%	101			70-130	Pass	
Chrysene	W22-Ma59698	NCP	%	110			70-130	Pass	
Dibenz(a,h)anthracene	W22-Ma59698	NCP	%	95			70-130	Pass	
Fluoranthene	W22-Ma59698	NCP	%	94			70-130	Pass	
Fluorene	W22-Ma59698	NCP	%	99			70-130	Pass	
Indeno(1,2,3-cd)pyrene	W22-Ma59698	NCP	%	94			70-130	Pass	
Naphthalene	W22-Ma59698	NCP	%	84			70-130	Pass	
Phenanthrene	W22-Ma59698	NCP	%	94			70-130	Pass	
Pyrene	W22-Ma59698	NCP	%	93			70-130	Pass	
Spike - % Recovery									
Phenols (Halogenated)				Result 1					
2-Chlorophenol	W22-Ma59698	NCP	%	85			30-130	Pass	
2,4-Dichlorophenol	W22-Ma59698	NCP	%	87			30-130	Pass	
2,4,5-Trichlorophenol	W22-Ma59698	NCP	%	75			30-130	Pass	
2,4,6-Trichlorophenol	W22-Ma59698	NCP	%	61			30-130	Pass	
2,6-Dichlorophenol	W22-Ma59698	NCP	%	76			30-130	Pass	
4-Chloro-3-methylphenol	W22-Ma59698	NCP	%	68			30-130	Pass	
Pentachlorophenol	W22-Ma59698	NCP	%	46			30-130	Pass	
Tetrachlorophenols - Total	W22-Ma59698	NCP	%	61			30-130	Pass	
Spike - % Recovery									
Phenols (non-Halogenated)				Result 1					
2-Cyclohexyl-4,6-dinitrophenol	W22-Ma59698	NCP	%	56			30-130	Pass	
2-Methyl-4,6-dinitrophenol	W22-Ma59698	NCP	%	54			30-130	Pass	
2-Nitrophenol	W22-Ma59698	NCP	%	73			30-130	Pass	
2,4-Dinitrophenol	W22-Ma59698	NCP	%	84			30-130	Pass	
2-Methylphenol (o-Cresol)	W22-Ma59698	NCP	%	56			30-130	Pass	
3&4-Methylphenol (m&p-Cresol)	W22-Ma59698	NCP	%	72			30-130	Pass	
4-Nitrophenol	W22-Ma59698	NCP	%	25			30-130	Fail	Q08
Dinoseb	W22-Ma59698	NCP	%	63			30-130	Pass	
Phenol	W22-Ma59698	NCP	%	46			30-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Benzo(a)pyrene	W22-Ma59698	NCP	%	88			70-130	Pass	
Spike - % Recovery									
Alkali Metals				Result 1					
Sodium	M22-Ma57126	CP	%	98			75-125	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C10-C14	M22-Ap0002247	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	M22-Ap0002247	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	M22-Ap0002247	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C10-C16	M22-Ap0002247	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH >C16-C34	M22-Ap0002247	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C34-C40	M22-Ap0002247	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
Phenols (Halogenated)				Result 1	Result 2	RPD			
2,6-Dichlorophenol	M22-Ma67637	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	

Duplicate								
				Result 1	Result 2	RPD		
Phosphate total (as P)	S22-Ma63555	NCP	mg/L	0.02	0.02	14	30%	Pass
Duplicate								
Alkali Metals				Result 1	Result 2	RPD		
Calcium	M22-Ma60847	NCP	mg/L	290	280	3.0	30%	Pass
Magnesium	M22-Ma60847	NCP	mg/L	760	720	6.0	30%	Pass
Potassium	M22-Ma60847	NCP	mg/L	280	240	13	30%	Pass
Duplicate								
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1	Result 2	RPD		
Perfluorobutanoic acid (PFBA)	M22-Ma66031	NCP	ug/L	1.4	1.2	13	30%	Pass
Perfluoropentanoic acid (PFPeA)	M22-Ma66031	NCP	ug/L	0.30	0.27	11	30%	Pass
Perfluorohexanoic acid (PFHxA)	M22-Ma66031	NCP	ug/L	0.97	0.81	19	30%	Pass
Perfluoroheptanoic acid (PFHpA)	M22-Ma66031	NCP	ug/L	0.14	0.12	17	30%	Pass
Perfluorooctanoic acid (PFOA)	M22-Ma66031	NCP	ug/L	0.21	0.19	13	30%	Pass
Perfluorononanoic acid (PFNA)	M22-Ma67309	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorodecanoic acid (PFDA)	M22-Ma67309	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoroundecanoic acid (PFUnDA)	M22-Ma67309	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorododecanoic acid (PFDoDA)	M22-Ma67309	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorotridecanoic acid (PFTrDA)	M22-Ma67309	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorotetradecanoic acid (PFTeDA)	M22-Ma67309	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Duplicate								
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD		
Perfluorooctane sulfonamide (FOSA)	M22-Ma67309	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M22-Ma67309	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M22-Ma67309	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	M22-Ma67309	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	M22-Ma67309	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M22-Ma67309	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M22-Ma67309	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
Duplicate								
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1	Result 2	RPD		
Perfluorobutanesulfonic acid (PFBS)	M22-Ma67309	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorononanesulfonic acid (PFNS)	M22-Ma67309	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropropanesulfonic acid (PFPrS)	M22-Ma67309	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropentanesulfonic acid (PFPeS)	M22-Ma67309	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorohexanesulfonic acid (PFHxS)	M22-Ma67309	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoroheptanesulfonic acid (PFHpS)	M22-Ma67309	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorooctanesulfonic acid (PFOS)	M22-Ma67309	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorodecanesulfonic acid (PFDS)	M22-Ma67309	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass

Duplicate								
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)				Result 1	Result 2	RPD		
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M22-Ma67309	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	M22-Ma66031	NCP	ug/L	3.1	3.0	2.0	30%	Pass
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M22-Ma67309	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M22-Ma67309	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Cyanide (total)	M22-Ma57123	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Duplicate								
Alkalinity (speciated)				Result 1	Result 2	RPD		
Bicarbonate Alkalinity (as CaCO ₃)	M22-Ap0005295	NCP	mg/L	320	320	<1	30%	Pass
Carbonate Alkalinity (as CaCO ₃)	M22-Ap0005295	NCP	mg/L	< 10	< 10	<1	30%	Pass
Hydroxide Alkalinity (as CaCO ₃)	M22-Ap0005295	NCP	mg/L	< 20	< 20	<1	30%	Pass
Total Alkalinity (as CaCO ₃)	M22-Ap0005295	NCP	mg/L	320	320	<1	30%	Pass
Duplicate								
Alkali Metals				Result 1	Result 2	RPD		
Sodium	M22-Ma57126	CP	mg/L	240	250	3.0	30%	Pass

Comments

This report has been revised (V2) following repeat analysis. TRH results for samples EMB7 & EMB13 have now been replaced by the repeat results.

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
N09	Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).
Q08	The matrix spike recovery is outside of the recommended acceptance criteria. An acceptable recovery was obtained for the laboratory control sample indicating a sample matrix interference.
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

Michael Morrison	Analytical Services Manager
Mary Makarios	Senior Analyst (NSW)
Joseph Edouard	Senior Analyst (VIC)
Scott Beddoes	Senior Analyst (NSW)
Edward Lee	Senior Analyst (VIC)



Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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**SAMPLE RECEIPT NOTIFICATION (SRN)****Work Order : ES2210617**

Client	: GRENCAP-NAA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: VARUN BHAGWAT	Contact	: Shane Ellis
Address	: 11/14 Winnellie Road WINNELLIE NT, AUSTRALIA 0820	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: varun.bhagwat@greencap.com.au	E-mail	: Shane.Ellis@ALSGlobal.com
Telephone	: ----	Telephone	: +61 2 8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: J174436 Groundwater Monitoring	Page	: 1 of 2
Order number	: PO299520	Quote number	: ES2020ADEENV0001 (EN/222)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: 800 Berrimah Rd, East Arm		
Sampler	: VARUN BHAGWAT		

Dates

Date Samples Received	: 29-Mar-2022 08:30	Issue Date	: 31-Mar-2022
Client Requested Due Date	: 06-Apr-2022	Scheduled Reporting Date	: 06-Apr-2022

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Intact.
No. of coolers/boxes	: 1	Temperature	: 12.4°C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 6 / 6

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- 30/03/22: This is an updated SRN which indicates the addition of metals analysis from an unpreserved vial as per request for this work order.
- 31/03/22: This is an updated SRN which indicates the removal of a previous comment for this work order.
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- **Glycols analysis will be conducted by ALS Melbourne.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

Summary of Sample(s) and Requested Analysis

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

✓	✓	✓	✓	✓	WATER - EG020F Dissolved Metals by ICP/MS
✓	✓	✓	✓	✓	WATER - EP067 Glycols analysis in water by GC/MS
✓	✓	✓	✓	✓	WATER - W-03 15 Metals (NEPM Suite)
✓					WATER - W-24 TRH/IBTEX/NP/PAH/Phenols

Proactive Holding Time Report

Requested Deliverables

- *AU Certificate of Analysis - NATA (COA)
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)
- A4 - AU Tax Invoice (INV)
- Chain of Custody (CoC) (COC)
- EDI Format - ENMRG (ENMRG)
- EDI Format - ESDAT (ESDAT)

[illegible]

QUALITY CONTROL REPORT

Work Order	: ES2210617	Page	: 1 of 9
Client	: GRENCAP-NAA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: VARUN BHAGWAT	Contact	: Shane Ellis
Address	: 11/14 Winnellie Road WINNELLIE NT, AUSTRALIA 0820	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61 2 8784 8555
Project	: J174436 Groundwater Monitoring	Date Samples Received	: 29-Mar-2022
Order number	: PO299520	Date Analysis Commenced	: 30-Mar-2022
C-O-C number	: ----	Issue Date	: 06-Apr-2022
Sampler	: VARUN BHAGWAT		
Site	: 800 Berrimah Rd, East Arm		
Quote number	: EN/222		
No. of samples received	: 6		
No. of samples analysed	: 6		



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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

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	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC



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.

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 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
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 4265130)									
ES2210617-001	EMB7	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.182	0.197	8.2	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	0.003	0.003	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.311	0.326	4.7	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.001	0.002	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.015	0.015	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	0.53	0.59	10.0	0% - 50%
ES2211002-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.010	0.009	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.025	0.025	0.0	0% - 20%



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 4265130) - continued									
ES2211002-001	Anonymous	EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.001	0.002	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	0.04	0.04	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	0.07	0.07	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 4265131)									
ES2210617-004	EMB14	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2210968-001	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EP067: Glycols (QC Lot: 4263488)									
EM2205749-001	Anonymous	EP067: 2-Ethoxyethyl acetate	111-15-9	2	mg/L	<2	<2	0.0	No Limit
		EP067: 2-Butoxyethanol	111-76-2	2	mg/L	<2	<2	0.0	No Limit
		EP067: Propylene glycol	57-55-6	2	mg/L	<2	<2	0.0	No Limit
		EP067: Ethylene glycol	107-21-1	2	mg/L	<2	<2	0.0	No Limit
		EP067: Diethylene glycol monobutyl ether	112-34-5	2	mg/L	<2	<2	0.0	No Limit
		EP067: Diethylene glycol	111-46-6	2	mg/L	<2	<2	0.0	No Limit
		EP067: Triethylene glycol	112-27-6	2	mg/L	<2	<2	0.0	No Limit
ES2210617-002	EMB12	EP067: 2-Ethoxyethyl acetate	111-15-9	2	mg/L	<2	<2	0.0	No Limit
		EP067: 2-Butoxyethanol	111-76-2	2	mg/L	<2	<2	0.0	No Limit
		EP067: Propylene glycol	57-55-6	2	mg/L	<2	<2	0.0	No Limit
		EP067: Ethylene glycol	107-21-1	2	mg/L	<2	<2	0.0	No Limit
		EP067: Diethylene glycol monobutyl ether	112-34-5	2	mg/L	<2	<2	0.0	No Limit
		EP067: Diethylene glycol	111-46-6	2	mg/L	<2	<2	0.0	No Limit
		EP067: Triethylene glycol	112-27-6	2	mg/L	<2	<2	0.0	No Limit
EP075(SIM)A: Phenolic Compounds (QC Lot: 4257113)									
ES2210967-001	Anonymous	EP075(SIM): Phenol	108-95-2	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2,4-Dimethylphenol	105-67-9	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2,4-Dichlorophenol	120-83-2	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2,6-Dichlorophenol	87-65-0	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2,4,6-Trichlorophenol	88-06-2	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 2,4,5-Trichlorophenol	95-95-4	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	2	µg/L	<2.0	<2.0	0.0	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2	µg/L	<2.0	<2.0	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 4257113)									
ES2210967-001	Anonymous	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	0.0	No Limit



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 4257113) - continued									
ES2210967-001	Anonymous	EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	1	µg/L	<1.0	<1.0	0.0	No Limit
			205-82-3						
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	0.0	No Limit
		EP075(SIM): Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	0.0	No Limit
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	<1.0	0.0	No Limit		
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4257114)									
ES2210967-001	Anonymous	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.0	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4258442)									
ES2210830-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES2210869-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4257114)									
ES2210967-001	Anonymous	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4258442)									
ES2210830-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES2210869-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 4258442)									
ES2210830-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	5	5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.0	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
ES2210869-001	Anonymous	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP080: BTEXN (QC Lot: 4258442) - continued									
ES2210869-001	Anonymous	EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.0	No Limit
		106-42-3							
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit



Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
Method: Compound	CAS Number	LOR	Unit		Result	Spike	Spike Recovery (%)	Acceptable Limits (%)
				Concentration		LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 4265130)								
EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	0.02 mg/L	84.7	70.0	130
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	86.0	85.0	114
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	86.6	85.0	115
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	85.1	82.0	110
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	86.3	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	87.3	85.0	111
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	82.5	82.0	112
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	82.6	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	89.6	83.0	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	86.0	82.0	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	86.2	82.0	112
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	85.9	85.0	115
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	88.1	83.0	109
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	82.9	81.0	117
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.5 mg/L	85.8	85.0	115
EG035F: Dissolved Mercury by FIMS (QCLot: 4265131)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	87.5	83.0	105
EP067: Glycols (QCLot: 4263488)								
EP067: 2-Ethoxyethyl acetate	111-15-9	2	mg/L	<2	100 mg/L	101	60.3	134
EP067: 2-Butoxyethanol	111-76-2	2	mg/L	<2	100 mg/L	108	61.6	140
EP067: Propylene glycol	57-55-6	2	mg/L	<2	100 mg/L	106	77.9	132
EP067: Ethylene glycol	107-21-1	2	mg/L	<2	100 mg/L	106	74.7	136
EP067: Diethylene glycol monobutyl ether	112-34-5	2	mg/L	<2	100 mg/L	113	73.4	136
EP067: Diethylene glycol	111-46-6	2	mg/L	<2	100 mg/L	130	74.4	138
EP067: Triethylene glycol	112-27-6	2	mg/L	<2	100 mg/L	132	69.0	142
EP075(SIM)A: Phenolic Compounds (QCLot: 4257113)								
EP075(SIM): Phenol	108-95-2	1	µg/L	<1.0	5 µg/L	43.3	24.5	61.9
EP075(SIM): 2-Chlorophenol	95-57-8	1	µg/L	<1.0	5 µg/L	77.0	52.0	90.0
EP075(SIM): 2-Methylphenol	95-48-7	1	µg/L	<1.0	5 µg/L	69.5	51.0	91.0
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	2	µg/L	<2.0	10 µg/L	65.5	44.0	88.0
EP075(SIM): 2-Nitrophenol	88-75-5	1	µg/L	<1.0	5 µg/L	70.7	48.0	100
EP075(SIM): 2,4-Dimethylphenol	105-67-9	1	µg/L	<1.0	5 µg/L	76.0	49.0	99.0
EP075(SIM): 2,4-Dichlorophenol	120-83-2	1	µg/L	<1.0	5 µg/L	83.4	53.0	105
EP075(SIM): 2,6-Dichlorophenol	87-65-0	1	µg/L	<1.0	5 µg/L	86.3	57.0	105



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP075(SIM)A: Phenolic Compounds (QCLot: 4257113) - continued								
EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	1	µg/L	<1.0	5 µg/L	75.5	53.0	99.0
EP075(SIM): 2,4,6-Trichlorophenol	88-06-2	1	µg/L	<1.0	5 µg/L	75.6	50.0	106
EP075(SIM): 2,4,5-Trichlorophenol	95-95-4	1	µg/L	<1.0	5 µg/L	68.7	51.0	105
EP075(SIM): Pentachlorophenol	87-86-5	2	µg/L	<2.0	10 µg/L	38.4	10.0	95.0
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4257113)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	76.6	50.0	94.0
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	86.2	63.6	114
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	80.2	62.2	113
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	79.6	63.9	115
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	88.7	62.6	116
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	76.4	64.3	116
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	93.0	63.6	118
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	92.4	63.1	118
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	71.1	64.1	117
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	74.6	62.5	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	1	µg/L	<1.0	5 µg/L	72.5	61.7	119
	205-82-3							
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	75.4	63.0	115
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	70.4	63.3	117
EP075(SIM): Indeno(1,2,3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	67.6	59.9	118
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	67.4	61.2	117
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	68.4	59.1	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4257114)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	68.3	55.8	112
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	80.2	71.6	113
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	88.2	56.0	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4258442)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	107	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4257114)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	77.2	57.9	119
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	70.5	62.5	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	70.7	61.5	121
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4258442)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	93.2	75.0	127
EP080: BTEXN (QCLot: 4258442)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	92.5	70.0	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	92.5	69.0	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	91.7	70.0	120



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	Low	High
EP080: BTEXN (QCLot: 4258442) - continued								
EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	10 µg/L	85.2	69.0	121
	106-42-3							
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	88.0	72.0	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	92.8	70.0	120

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 4265130)							
ES2210617-002	EMB12	EG020A-F: Arsenic	7440-38-2	1 mg/L	79.9	70.0	130
		EG020A-F: Beryllium	7440-41-7	1 mg/L	90.1	70.0	130
		EG020A-F: Barium	7440-39-3	1 mg/L	88.7	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	83.6	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	70.5	70.0	130
		EG020A-F: Cobalt	7440-48-4	1 mg/L	84.0	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	82.1	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	79.1	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	85.5	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	84.1	70.0	130
		EG020A-F: Vanadium	7440-62-2	1 mg/L	75.9	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	85.8	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 4265131)							
ES2210617-003	EMB13	EG035F: Mercury	7439-97-6	0.01 mg/L	87.0	70.0	130
EP067: Glycols (QCLot: 4263488)							
EM2205782-001	Anonymous	EP067: 2-Ethoxyethyl acetate	111-15-9	100 mg/L	91.8	37.5	146
		EP067: 2-Butoxyethanol	111-76-2	100 mg/L	102	43.6	151
		EP067: Propylene glycol	57-55-6	100 mg/L	103	69.4	137
		EP067: Ethylene glycol	107-21-1	100 mg/L	102	59.9	140
		EP067: Diethylene glycol monobutyl ether	112-34-5	100 mg/L	109	56.8	147
		EP067: Diethylene glycol	111-46-6	100 mg/L	129	46.9	150
		EP067: Triethylene glycol	112-27-6	100 mg/L	141	32.2	156
EP075(SIM)A: Phenolic Compounds (QCLot: 4257113)							
ES2210967-001	Anonymous	EP075(SIM): Phenol	108-95-2	20 µg/L	32.7	20.0	130
		EP075(SIM): 2-Chlorophenol	95-57-8	20 µg/L	85.3	60.0	130



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP075(SIM)A: Phenolic Compounds (QCLot: 4257113) - continued							
ES2210967-001	Anonymous	EP075(SIM): 2-Nitrophenol	88-75-5	20 µg/L	74.5	60.0	130
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	20 µg/L	86.9	70.0	130
		EP075(SIM): Pentachlorophenol	87-86-5	20 µg/L	55.7	20.0	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4257113)							
ES2210967-001	Anonymous	EP075(SIM): Acenaphthene	83-32-9	20 µg/L	77.7	70.0	130
		EP075(SIM): Pyrene	129-00-0	20 µg/L	87.2	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4257114)							
ES2210967-001	Anonymous	EP071: C10 - C14 Fraction	----	200 µg/L	107	70.0	130
		EP071: C15 - C28 Fraction	----	250 µg/L	113	71.0	130
		EP071: C29 - C36 Fraction	----	200 µg/L	92.2	67.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4258442)							
ES2210830-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	87.5	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4257114)							
ES2210967-001	Anonymous	EP071: >C10 - C16 Fraction	----	250 µg/L	93.1	70.0	130
		EP071: >C16 - C34 Fraction	----	350 µg/L	95.9	75.0	130
		EP071: >C34 - C40 Fraction	----	150 µg/L	94.6	67.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4258442)							
ES2210830-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	89.7	70.0	130
EP080: BTEXN (QCLot: 4258442)							
ES2210830-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	81.6	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	75.3	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	80.8	70.0	130
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	78.6	70.0	130
			106-42-3				
		EP080: ortho-Xylene	95-47-6	25 µg/L	82.5	70.0	130
	EP080: Naphthalene	91-20-3	25 µg/L	92.6	70.0	130	

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES2210617	Page	: 1 of 5
Client	: GREENCAP-NAA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: VARUN BHAGWAT	Telephone	: +61 2 8784 8555
Project	: J174436 Groundwater Monitoring	Date Samples Received	: 29-Mar-2022
Site	: 800 Berrimah Rd, East Arm	Issue Date	: 06-Apr-2022
Sampler	: VARUN BHAGWAT	No. of samples received	: 6
Order number	: PO299520	No. of samples analysed	: 6

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- **NO** Matrix Spike outliers occur.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- **NO** Quality Control Sample Frequency Outliers exist.



Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EG020F: Dissolved Metals by ICP-MS								
VOC Vial - unpreserved (EG020A-F) EMB7, EMB13, EMB15	EMB12, EMB14,	25-Mar-2022	----	----	----	04-Apr-2022	21-Sep-2022	✓
EG035F: Dissolved Mercury by FIMS								
VOC Vial - unpreserved (EG035F) EMB7, EMB13, EMB15	EMB12, EMB14,	25-Mar-2022	----	----	----	04-Apr-2022	08-Apr-2022	✓
EP067: Glycols								
VOC Vial - unpreserved (EP067) EMB7, EMB13, EMB15	EMB12, EMB14,	25-Mar-2022	01-Apr-2022	01-Apr-2022	✓	01-Apr-2022	01-Apr-2022	✓
EP075(SIM)A: Phenolic Compounds								
Amber Glass Bottle - Unpreserved (EP075(SIM)) QC01A		25-Mar-2022	30-Mar-2022	01-Apr-2022	✓	04-Apr-2022	09-May-2022	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP075(SIM)) QC01A		25-Mar-2022	30-Mar-2022	01-Apr-2022	✓	04-Apr-2022	09-May-2022	✓
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071) QC01A		25-Mar-2022	30-Mar-2022	01-Apr-2022	✓	03-Apr-2022	09-May-2022	✓
Clear glass VOC vial - HCl (EP080) QC01A		25-Mar-2022	01-Apr-2022	08-Apr-2022	✓	01-Apr-2022	08-Apr-2022	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071) QC01A		25-Mar-2022	30-Mar-2022	01-Apr-2022	✓	03-Apr-2022	09-May-2022	✓
Clear glass VOC vial - HCl (EP080) QC01A		25-Mar-2022	01-Apr-2022	08-Apr-2022	✓	01-Apr-2022	08-Apr-2022	✓



Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080: BTEXN							
Clear glass VOC vial - HCl (EP080) QC01A	25-Mar-2022	01-Apr-2022	08-Apr-2022	✓	01-Apr-2022	08-Apr-2022	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Dissolved Mercury by FIMS	EG035F	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Glycols by GCMS	EP067	2	14	14.29	10.00	✔	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	5	20.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	5	20.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Dissolved Mercury by FIMS	EG035F	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Glycols by GCMS	EP067	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	5	20.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	5	20.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Dissolved Mercury by FIMS	EG035F	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Glycols by GCMS	EP067	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	5	20.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	5	20.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Dissolved Mercury by FIMS	EG035F	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Glycols by GCMS	EP067	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	5	20.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	5	20.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
Glycols by GCMS	EP067	WATER	In house method for the analysis of Glycols in water by GCMS
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015 The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270 Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260 Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM Schedule B(3)
Preparation Methods	Method	Matrix	Method Descriptions
Sample Preparation for Glycols in water analysis	EP067-PR	WATER	In house. Samples are pre-filtered and diluted 1:1 with methanol. Internal standards are added prior to analysis.
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for purging.

CERTIFICATE OF ANALYSIS

Work Order : **ES2210617**
Client : **GREENCAP-NAA PTY LTD**
Contact : VARUN BHAGWAT
Address : 11/14 Winnellie Road
 WINNELLIE NT, AUSTRALIA 0820
Telephone : ----
Project : J174436 Groundwater Monitoring
Order number : PO299520
C-O-C number : ----
Sampler : VARUN BHAGWAT
Site : 800 Berrimah Rd, East Arm
Quote number : EN/222
No. of samples received : 6
No. of samples analysed : 6

Page : 1 of 6
Laboratory : Environmental Division Sydney
Contact : Shane Ellis
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61 2 8784 8555
Date Samples Received : 29-Mar-2022 08:30
Date Analysis Commenced : 30-Mar-2022
Issue Date : 06-Apr-2022 16:17



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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC



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.

- EP075 (SIM): Where reported, Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- No standard reference exists for the Holding Time of Glycols in waters. ALS takes a conservative approach and applies a holding time of 7 days for analysis.



Analytical Results

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

Sample ID

				EMB7	EMB12	EMB13	EMB14	EMB15
Sampling date / time				25-Mar-2022 00:00	25-Mar-2022 00:00	25-Mar-2022 00:00	25-Mar-2022 00:00	25-Mar-2022 00:00
Compound	CAS Number	LOR	Unit	ES2210617-001	ES2210617-002	ES2210617-003	ES2210617-004	ES2210617-005
				Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS								
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.002	<0.001	0.001
Boron	7440-42-8	0.05	mg/L	0.53	0.55	0.72	0.58	0.73
Barium	7440-39-3	0.001	mg/L	0.182	0.255	0.188	0.357	0.122
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	0.0001
Cobalt	7440-48-4	0.001	mg/L	0.003	<0.001	<0.001	<0.001	0.006
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L	0.001	<0.001	0.002	<0.001	0.011
Manganese	7439-96-5	0.001	mg/L	0.311	0.001	0.027	0.001	2.00
Nickel	7440-02-0	0.001	mg/L	0.001	0.003	0.001	0.001	0.005
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.001	<0.001	0.002
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	7440-66-6	0.005	mg/L	0.015	<0.005	0.013	0.420	0.031
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EP067: Glycols								
2-Ethoxyethyl acetate	111-15-9	2	mg/L	<2	<2	<2	<2	<2
2-Butoxyethanol	111-76-2	2	mg/L	<2	<2	<2	<2	<2
Propylene glycol	57-55-6	2	mg/L	<2	<2	<2	<2	<2
Ethylene glycol	107-21-1	2	mg/L	<2	<2	<2	<2	<2
Diethylene glycol monobutyl ether	112-34-5	2	mg/L	<2	<2	<2	<2	<2
Diethylene glycol	111-46-6	2	mg/L	<2	<2	<2	<2	<2
Triethylene glycol	112-27-6	2	mg/L	<2	<2	<2	<2	<2



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				QC01A	----	----	----	----
Sampling date / time				25-Mar-2022 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2210617-006	-----	-----	-----	-----
Result				----	----	----	----	----
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	1.0	µg/L	<1.0	----	----	----	----
2-Chlorophenol	95-57-8	1.0	µg/L	<1.0	----	----	----	----
2-Methylphenol	95-48-7	1.0	µg/L	<1.0	----	----	----	----
3- & 4-Methylphenol	1319-77-3	2.0	µg/L	<2.0	----	----	----	----
2-Nitrophenol	88-75-5	1.0	µg/L	<1.0	----	----	----	----
2,4-Dimethylphenol	105-67-9	1.0	µg/L	<1.0	----	----	----	----
2,4-Dichlorophenol	120-83-2	1.0	µg/L	<1.0	----	----	----	----
2,6-Dichlorophenol	87-65-0	1.0	µg/L	<1.0	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L	<1.0	----	----	----	----
2,4,6-Trichlorophenol	88-06-2	1.0	µg/L	<1.0	----	----	----	----
2,4,5-Trichlorophenol	95-95-4	1.0	µg/L	<1.0	----	----	----	----
Pentachlorophenol	87-86-5	2.0	µg/L	<2.0	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1.0	µg/L	<1.0	----	----	----	----
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	----	----	----	----
Acenaphthene	83-32-9	1.0	µg/L	<1.0	----	----	----	----
Fluorene	86-73-7	1.0	µg/L	<1.0	----	----	----	----
Phenanthrene	85-01-8	1.0	µg/L	<1.0	----	----	----	----
Anthracene	120-12-7	1.0	µg/L	<1.0	----	----	----	----
Fluoranthene	206-44-0	1.0	µg/L	<1.0	----	----	----	----
Pyrene	129-00-0	1.0	µg/L	<1.0	----	----	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	----	----	----	----
Chrysene	218-01-9	1.0	µg/L	<1.0	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L	<1.0	----	----	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L	<1.0	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	1.0	µg/L	<1.0	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	-----	0.5	µg/L	<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	-----	0.5	µg/L	<0.5	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	-----	20	µg/L	<20	----	----	----	----
C10 - C14 Fraction	-----	50	µg/L	<50	----	----	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	QC01A	----	----	----	----
Sampling date / time					25-Mar-2022 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2210617-006	-----	-----	-----	-----
					Result	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons - Continued									
C15 - C28 Fraction	----	100	µg/L		<100	----	----	----	----
C29 - C36 Fraction	----	50	µg/L		<50	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	----	----	----	----
>C10 - C16 Fraction	----	100	µg/L		<100	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L		<100	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L		<100	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	----	----	----	----
Toluene	108-88-3	2	µg/L		<2	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L		<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L		<2	----	----	----	----
^ Total Xylenes	----	2	µg/L		<2	----	----	----	----
^ Sum of BTEX	----	1	µg/L		<1	----	----	----	----
Naphthalene	91-20-3	5	µg/L		<5	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1.0	%		24.4	----	----	----	----
2-Chlorophenol-D4	93951-73-6	1.0	%		62.2	----	----	----	----
2,4,6-Tribromophenol	118-79-6	1.0	%		76.3	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1.0	%		71.6	----	----	----	----
Anthracene-d10	1719-06-8	1.0	%		94.6	----	----	----	----
4-Terphenyl-d14	1718-51-0	1.0	%		81.0	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%		81.4	----	----	----	----
Toluene-D8	2037-26-5	2	%		92.4	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%		86.7	----	----	----	----



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	44
2-Chlorophenol-D4	93951-73-6	14	94
2,4,6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

Inter-Laboratory Testing

Analysis conducted by ALS Melbourne, NATA accreditation no. 825, site no. 13778 (Chemistry).

(WATER) EP067: Glycols



29 April 2022

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George Hatzimihalis
Technical Director
Global Resource Recovery
Vopak Terminal, East Arm
Northern Territory 0822

RE: GLOBAL RESOURCE RECOVERY – MONTHLY GROUNDWATER MONITORING EVENT (APRIL 2022)

1.0 Introduction

Greencap Pty Ltd (Greencap) was commissioned by Global Resource Recovery (GRR) to implement a groundwater monitoring program, inclusive of monthly, quarterly and annual monitoring events at the Vopak Terminal located at East Arm, Northern Territory (the Site).

Greencap has previously undertaken monthly groundwater monitoring at the Site in accordance with Attachment B of the Environment Protection Licence (EPL) 229-01.

This report details the results of the April 2022 monthly monitoring event.

2.0 Groundwater Monthly Monitoring Event – April 2022

The monthly monitoring event included:

- Gauging of water levels in all five monitoring bores.
- Measurement of field parameters in two monitoring bores.

2.1 Methodology

Greencap conducted a monitoring event on 13 April 2022 involving the gauging of five monitoring bores (EMB7, EMB12, EMB13, EMB14 and EMB15) and the measurement of field parameters in two monitoring bores (EMB13 and EMB14).

The following methodology was applied:

- Measuring standing water levels (SWL) from the surveyed point at the top of the casings using water/product interface water level meter prior to sampling.
- Monitoring physio-chemical parameters (pH, temperature, dissolved oxygen, electrical conductivity, salinity, total dissolved solids, turbidity and oxidation-reduction potential) during purging using a calibrated water quality meter. A low flow peristaltic pump with monitoring bore-specific dedicated tubing was used to draw groundwater from the monitoring bores. Field parameters were recorded once they were deemed to have stabilised. Field observations were recorded during sampling including aesthetic evidence of contamination such as sheen, colour and odour.

2.2 Results

The recorded SWLs and measured field parameters are presented in Table 1 and Table 2 respectively.

Table 1 – April 2022 Groundwater Levels

Well ID	Date	SWL			Depth of Bore (m)
		mBTOC	mBGL	mAHD	
EMB7	13/04/2022	1.268	1.268	5.157	9.237
EMB12	13/04/2022	2.686	2.686	3.814	9.325
EMB13	13/04/2022	2.823	2.023	6.013	10.245
EMB14	13/04/2022	2.924	2.224	6.331	9.803
EMB15	13/04/2022	0.957	0.957	6.427	9.314

mBTOC – metres below top of casing

mBGL – metres below ground level

mAHD – metres Australian Height Datum

Table 2 – April 2022 Field Parameters

Well ID	pH	Temperature (°C)	Dissolved Oxygen (% saturation)	Electrical Conductivity (µS/cm)	Salinity (PSU)	Total Dissolved Solids (mg/L)	Turbidity (NTU)	ORP (mV)
EMB13	3.94	32.8	17.1	258.9	0.12	168	5.61	46.5
EMB14	6.39	33.8	26.0	217.7	0.10	142	6.21	-6.4

Field records are presented in Attachment 2.

The next groundwater monitoring event is scheduled to occur in May 2022.

Attachments

- 1 Statements of Limitation
- 2 Field Record Sheets

Yours Sincerely,



Varun Bhagwat
 Environmental Consultant - NT
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Groundwater Monitoring Event – April 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 1: Statements of Limitation

Statements of Limitation

All and any Services proposed by Greencap to the Client were subject to the Terms and Conditions listed on the Greencap website at: <https://www.greencap.com.au/terms-conditions> Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap does not agree to any alternative terms or variation of these terms if subsequently proposed by the Client. The Services were carried out in accordance with the current and relevant industry standards of testing, interpretation and analysis. The Services were carried out in accordance with Commonwealth, State, Territory or Government legislation, regulations and/or guidelines. The Client was deemed to have accepted these Terms when the Client signed the Proposal (where indicated) or when the Company commenced the Services at the request (written or otherwise) of the Client.

The services were carried out for the Specific Purpose, outlined in the body of the Proposal. To the fullest extent permitted by law, Greencap, its related bodies corporate, its officers, consultants, employees and agents assume no liability, and will not be liable to any person, or in relation to, any losses, damages, costs or expenses, and whether arising in contract, tort including negligence, under statute, in equity or otherwise, arising out of, or in connection with, any matter outside the Specific Purpose.

The Client acknowledged and agreed that proposed investigations were to rely on information provided to Greencap by the Client or other third parties. Greencap made no representation or warranty regarding the completeness or accuracy of any descriptions or conclusions based on information supplied to it by the Client, its employees or other third parties during provision of the Services. Under no circumstances shall Greencap have any liability for, or in relation to, any work, reports, information, plans, designs, or specifications supplied or prepared by any third party, including any third party recommended by Greencap. The Client releases and indemnifies Greencap from and against all Claims arising from errors, omissions or inaccuracies in documents or other information provided to Greencap by the Client, its employees or other third parties.

The Client was to ensure that Greencap had access to all information, sites and buildings as required by or necessary for Greencap to undertake the Services. Notwithstanding any other provision in these Terms, Greencap will have no liability to the Client or any third party to the extent that the performance of the Services was not able to be undertaken (in whole or in part) due to access to any relevant sites or buildings being prevented or delayed due to the Client or their respective employees or contractors expressing safety or health concerns associated with such access.

Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap, its related bodies corporate, its officers, employees and agents assume no liability and will not be liable for lost profit, revenue, production, contract, opportunity, loss arising from business interruption or delay, indirect or consequential loss or loss to the extent caused or contributed to by the Client or third parties, suffered or incurred arising out of or in connection with our Proposals, Reports, the Project or the Agreement. In the event Greencap is found by a Court or Tribunal to be liable to the Client for any loss or damage arising in connection with the Services, the Client's entitlement to recover damages from Greencap shall be reduced by such amount as reflects the extent to which any act, default, omission or negligence of the Client, or any third party, caused or contributed to such loss or damage. Unless otherwise agreed in writing and signed by both parties, Greencap's total aggregate liability will not exceed the total consulting fees paid by the client in relation to this Proposal. For further detail, see Greencap's Terms and Conditions available at <https://www.greencap.com.au/terms-conditions>

The Report is provided for the exclusive use of the Client and for this Project only, in accordance with the Scope and Specific Purpose as outlined in the Agreement, and only those third parties who have been authorized in writing by Greencap. It should not be used for other purposes, other projects or by a third party unless otherwise agreed and authorized in writing by Greencap. Any person relying upon this Report beyond its exclusive use and Specific Purpose, and without the express written consent of Greencap, does so entirely at their own risk and without recourse to Greencap for any loss, liability or damage. To the extent permitted by law, Greencap assumes no responsibility for any loss, liability, damage, costs or expenses arising from interpretations or conclusions made by others, or use of the Report by a third party. Except as specifically agreed by Greencap in writing, it does not authorize the use of this Report by any third party. It is the responsibility of third parties to independently make inquiries or seek advice in relation to their particular requirements and proposed use of the site.

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This Report should be read in whole and should not be copied in part or altered. The Report as a whole set outs the findings of the investigations. No responsibility is accepted by Greencap for use of parts of the Report in the absence (or out of context) of the balance of the Report.



Groundwater Monitoring Event – April 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 2: Field Record Sheets

Greencap
Groundwater Level Gauging Form



Client: GRR		Job No: J174436
Project: GME		Gauged by: VB
Location: East Arm, NT		Date: 13/4/22

Water Level Dipper Type (interphase, length etc): IP

Time	Well Name	Depth to Product (m)	Depth to water (m)	Product Thickness (mm)	Depth of Well (m)	Comments
0952	EMB13	—	2.823	—	10.245	
1025	EMB14	—	2.924	—	9.314	
1112	EMB7	—	1.268	—	9.287	
1122	EMB12	—	2.686	—	9.325	
1126	EMB15	—	0.957	—	9.314	

Observations / Comments:

Weather Conditions (e.g. cloudy, sunny, windy etc), Pumping, etc

SUNNY & SLIGHT WIND

Groundwater Sampling Record

Client: <u>GRR</u>		Job No: <u>J174436</u>		Well ID <u>EMB13</u>	
Project: <u>GME</u>		Sampled by: <u>VB</u>			
Location: <u>East Arm, NT</u>		Date: <u>13/4/22</u>			

WELL DETAILS	SAMPLING EQUIPMENT
Well depth: <u>10.245</u> (m)	Device: <u>micropurge</u> <u>peristaltic</u> footvalve bailer
Casing diameter: <u>50</u> (mm)	Method: <u>low-flow</u> 4-well-volume purged dry
Casing type: <u>PVC</u> / steel / other	WQM Make: <u>YSI</u>
Depth to product <u>—</u> (m bTOC)	WL Meter: <u>interface</u> non-interface
Depth to water: <u>2.823</u> (m bTOC)	Screen (from - to), m <u>7.245 - 10.245</u>
Product thickness <u>—</u> (m)	Pump Depth (m bTOC)

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
SUNNY & SLIGHT WIND

Purging instructions:
 Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.
Low Flow: The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre; 100mm (4") diameter - 8 L/metre; 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment	
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond (µS/cm / mS/cm)	ORP mV	DO mg/L / ppm / %	Turbidity, Colour, Odour, Sheen, etc TDS SAL T-NT mg/L NTU PSU	
1004	INT	3.328	32.7	4.04	278.5	44.9	15.3	180.7	0.13
1007	2	4.526	32.7	3.98	277.4	48.4	16.6	180.05	0.13
1010	4	4.999	32.8	3.98	275.5	49.9	18.2	178.75	0.13
1013	6	5.414	32.8	3.92	270.4	50.2	18.4	175.5	0.13
1016	8	5.778	32.8	3.92	265.9	48.8	18.9	172.25	0.12
1019	10	6.006	32.8	3.94	261.1	47.4	18.2	169.65	0.12
1022	12	6.142	32.8	3.94	258.9	46.5	17.1	167.65	0.12 5.61
1025	14								

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc
PURGED 12 L
SLOW RECHARGE
L-M TURB, NO SHEENS/ODOURS, CLEAR

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments
Glass amber (100-250ml)		none	Duplicate ID	
Glass vial (40mL)		HCl		
Plastic (60mL) - metals*		HNO3		
Plastic (60mL) - cyanide, CrVI*		NaOH	Triplicate ID	
Plastic (60mL) - nutrients		H2SO4		
Plastic (500mL) - inorganics		none	Blanks	
Plastic ()			Rinsate ID	
Plastic ()				
Plastic ()				

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

Client: <u>GRR</u>		Job No: <u>J174436</u>		Well ID <u>EMB14</u>	
Project: <u>GME</u>		Sampled by: <u>VB</u>			
Location: <u>East Arm, NT</u>		Date: <u>13/4/22</u>			

WELL DETAILS			SAMPLING EQUIPMENT				*Other Sampling Equipment / Method
Well depth:	<u>9.314</u> (m)	Device:	<u>micropurge</u>	<u>peristaltic</u>	<u>footvalve</u>	<u>bailer</u>	
Casing diameter:	<u>50</u> (mm)	Method:	<u>low-flow</u>	<u>4-well-volume</u>	<u>purged dry</u>		
Casing type:	<u>PVC</u> / steel / other	WQM Make:	<u>YSI</u>				
Depth to product	<u>-</u> (m bTOC)	WL Meter:	<u>interface</u> <u>non-interface</u>				
Depth to water:	<u>7.924</u> (m bTOC)	Screen (from - to), m	<u>6.314 - 9.314</u>				
Product thickness	<u>-</u> (m)	Pump Depth (m bTOC)					

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
SUNNY & SLIGHT WIND
WELL CAP HAD BEEN REMOVED

Purging instructions:
 Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

Low Flow: The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
 Well volume: 50mm (2" diameter) - 2 L/metre, 100mm (4" diameter) - 8 L/metre, 150mm (6" diameter) - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment Turbidity, Colour, Odour, Sheen, etc
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond <u>µS/cm</u> / mS/cm	ORP mV	DO mg/L / ppm / %	
1035	<u>2.2</u>	<u>2.924</u>	<u>33.8</u>	<u>5.71</u>	<u>214.9</u>	<u>31.5</u>	<u>24.4</u>	<u>139.75</u> <u>0.18</u>
1038	<u>2</u>	<u>3.796</u>	<u>33.9</u>	<u>6.62</u>	<u>216.4</u>	<u>7.0</u>	<u>19.7</u>	<u>141.05</u> <u>0.10</u>
1041	<u>4</u>	<u>4.544</u>	<u>33.8</u>	<u>6.18</u>	<u>216.9</u>	<u>-0.9</u>	<u>19.4</u>	<u>141.05</u> <u>0.10</u>
1044	<u>6</u>	<u>5.025</u>	<u>33.9</u>	<u>6.26</u>	<u>216.7</u>	<u>-1.4</u>	<u>25.5</u>	<u>140.40</u> <u>0.10</u>
1047	<u>8</u>	<u>5.671</u>	<u>34.0</u>	<u>6.32</u>	<u>217.4</u>	<u>-1.6</u>	<u>24.5</u>	<u>141.05</u> <u>0.10</u>
1050	<u>10</u>	<u>6.219</u>	<u>34.0</u>	<u>6.37</u>	<u>217.3</u>	<u>-6.1</u>	<u>30.0</u>	<u>141.05</u> <u>0.10</u>
1053	<u>12</u>	<u>6.842</u>	<u>33.8</u>	<u>6.39</u>	<u>217.7</u>	<u>-6.4</u>	<u>26.0</u>	<u>141.70</u> <u>0.10</u> <u>6.21</u>

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc
PURGED 12L
SLOW RECHARGE
L-M TURB, CLEAR, NO SHEENS/ODOURS

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments
Glass amber (100-250ml)		none	Duplicate ID	
Glass vial (40mL)		HCl		
Plastic (60mL) - metals*		HNO3		
Plastic (60mL) - cyanide, CrVI*		NaOH	Triplicate ID	
Plastic (60mL) - nutrients		H2SO4		
Plastic (500mL) - inorganics		none	Blanks	
Plastic ()				
Plastic ()				
			Rinsate ID	

*samples for dissolved metals to be filtered in the field prior to filling sampling container



26 May 2022

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George Hatzimihalis
Technical Director
Global Resource Recovery
Vopak Terminal, East Arm
Northern Territory 0822

RE: GLOBAL RESOURCE RECOVERY – MONTHLY GROUNDWATER MONITORING EVENT (MAY 2022)

1.0 Introduction

Greencap Pty Ltd (Greencap) was commissioned by Global Resource Recovery (GRR) to implement a groundwater monitoring program, inclusive of monthly, quarterly and annual monitoring events at the Vopak Terminal located at East Arm, Northern Territory (the Site).

Greencap has previously undertaken monthly groundwater monitoring at the Site in accordance with Attachment B of the Environment Protection Licence (EPL) 229-01.

This report details the results of the May 2022 monthly monitoring event.

2.0 Groundwater Monthly Monitoring Event – May 2022

The monthly monitoring event included:

- Gauging of water levels in all five monitoring bores.
- Measurement of field parameters in two monitoring bores.

2.1 Methodology

Greencap conducted a monitoring event on 25 May 2022 involving the gauging of five monitoring bores (EMB7, EMB12, EMB13, EMB14 and EMB15) and the measurement of field parameters in two monitoring bores (EMB13 and EMB14).

The following methodology was applied:

- Measuring standing water levels (SWL) from the surveyed point at the top of the casings using water/product interface water level meter prior to sampling.
- Monitoring physio-chemical parameters (pH, temperature, dissolved oxygen, electrical conductivity, salinity, total dissolved solids, turbidity and oxidation-reduction potential) during purging using a calibrated water quality meter. A low flow peristaltic pump with monitoring bore-specific dedicated tubing was used to draw groundwater from the monitoring bores. Field parameters were recorded once they were deemed to have stabilised. Field observations were recorded during sampling including aesthetic evidence of contamination such as sheen, colour and odour.

2.2 Results

The recorded SWLs and measured field parameters are presented in Table 1 and Table 2 respectively.

Table 1 – May 2022 Groundwater Levels

Well ID	Date	SWL			Depth of Bore (m)
		mBTOC	mBGL	mAHD	
EMB7	25/05/2022	2.141	2.141	4.284	9.237
EMB12	25/05/2022	1.974	1.974	4.526	9.325
EMB13	25/05/2022	3.777	2.977	5.059	10.245
EMB14	25/05/2022	3.998	3.298	5.257	9.803
EMB15	25/05/2022	0.55	0.55	6.834	9.314

mBTOC – metres below top of casing

mBGL – metres below ground level

mAHD – metres Australian Height Datum

Table 2 – May 2022 Field Parameters

Well ID	pH	Temperature (°C)	Dissolved Oxygen (% saturation)	Electrical Conductivity (µS/cm)	Salinity (PSU)	Total Dissolved Solids (mg/L)	Turbidity (NTU)	ORP (mV)
EMB13	3.91	33.0	15.7	260.5	0.12	170	5.32	36.7
EMB14	6.36	34.3	16.3	243.9	0.11	159	6.34	-14.8

Field records are presented in Attachment 2.

The next groundwater monitoring event is scheduled to occur in June 2022.

Attachments

- 1 Statements of Limitation
- 2 Field Record Sheets

Yours Sincerely,



Varun Bhagwat
 Environmental Consultant - NT
 T: 0428 829 444
 E: Varun.Bhagwat@greencap.com.au



Groundwater Monitoring Event – May 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 1: Statements of Limitation

Statements of Limitation

All and any Services proposed by Greencap to the Client were subject to the Terms and Conditions listed on the Greencap website at: <https://www.greencap.com.au/terms-conditions> Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap does not agree to any alternative terms or variation of these terms if subsequently proposed by the Client. The Services were carried out in accordance with the current and relevant industry standards of testing, interpretation and analysis. The Services were carried out in accordance with Commonwealth, State, Territory or Government legislation, regulations and/or guidelines. The Client was deemed to have accepted these Terms when the Client signed the Proposal (where indicated) or when the Company commenced the Services at the request (written or otherwise) of the Client.

The services were carried out for the Specific Purpose, outlined in the body of the Proposal. To the fullest extent permitted by law, Greencap, its related bodies corporate, its officers, consultants, employees and agents assume no liability, and will not be liable to any person, or in relation to, any losses, damages, costs or expenses, and whether arising in contract, tort including negligence, under statute, in equity or otherwise, arising out of, or in connection with, any matter outside the Specific Purpose.

The Client acknowledged and agreed that proposed investigations were to rely on information provided to Greencap by the Client or other third parties. Greencap made no representation or warranty regarding the completeness or accuracy of any descriptions or conclusions based on information supplied to it by the Client, its employees or other third parties during provision of the Services. Under no circumstances shall Greencap have any liability for, or in relation to, any work, reports, information, plans, designs, or specifications supplied or prepared by any third party, including any third party recommended by Greencap. The Client releases and indemnifies Greencap from and against all Claims arising from errors, omissions or inaccuracies in documents or other information provided to Greencap by the Client, its employees or other third parties.

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This Report should be read in whole and should not be copied in part or altered. The Report as a whole set outs the findings of the investigations. No responsibility is accepted by Greencap for use of parts of the Report in the absence (or out of context) of the balance of the Report.



Groundwater Monitoring Event – May 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 2: Field Record Sheets

Client: GRR		Job No: J174436
Project: GME		Gauged by: VB
Location: East Arm, NT		Date: 25/5/22

Water Level Dipper Type (interphase, length etc): IP

[illegible]

Observations / Comments:

Weather Conditions (e.g. cloudy, sunny, windy etc), Pumping, etc

SUNNY & SLIGHT WIND

Groundwater Sampling Record

Client: <u>GRR</u>		Job No: <u>J174436</u>		Well ID <u>EMB13</u>
Project: <u>GME</u>		Sampled by: <u>VB</u>		
Location: <u>East Arm, NT</u>		Date: <u>26/5/22</u>		
WELL DETAILS		SAMPLING EQUIPMENT		
Well depth: <u>10.245</u> (m)	Device: <u>micropurge</u> <u>peristaltic</u> footvalve bailer	*Other Sampling Equipment / Method		
Casing diameter: <u>50</u> (mm)	Method: <u>low-flow</u> 4-well-volume purged dry			
Casing type: <u>PVC</u> / steel / other	WQM Make: <u>CSI</u>			
Depth to product (m bTOC)	WL Meter: <u>interface</u> non-interface			
Depth to water: <u>3.777</u> (m bTOC)	Screen (from - to), m <u>7.245 - 10.245</u>			
Product thickness (m)	Pump Depth (m bTOC)			
Field observations: eg. well condition, nearby activities, weather, vegetation, etc <u>SUNNY & SLIGHT WIND</u>				

Purging instructions:

Low Flow: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume: The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre; 100mm (4") diameter - 8 L/metre; 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment Turbidity, Colour, Odour, Sheen, etc TDS SAL T-NO mg/L / ppm / % mull PSU NTU
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond <u>µS/cm</u> mS/cm	ORP mV	DO mg/L / ppm / %	
1225	1NT	3.929	31.3	4.74	284.9	6.3	19.4	173.8 0.12
1228	2	4.481	32.4	4.38	273.3	4.2	18.7	173.4 0.12
1231	4	4.988	32.7	3.98	269.2	1.8	16.2	173.4 0.12
1234	6	5.231	32.9	3.98	268.6	1.1	13.8	173.1 0.12
1237	~~8~~ 8	5.784	32.9	3.98	266.9	0.6	11.3	172.90 0.12
1240	10	6.029	32.9	3.96	262.8	3.0	10.8	170.30 0.12
1243	12	6.218	32.9	3.96	258.3	5.4	10.8	168.75 0.12
1246	14	6.397	33.0	3.94	259.0	26.2	13.4	168.35 0.12
1249	16	6.532	33.0	3.91	260.5	36.7	15.7	169.65 0.12 5.32

Observations during Sampling: eg. odours, sheens, turbidity, water colour, etc
LOW FLOW, CLEAR, NO SHEEN / ODOUR

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments
Glass amber (100-250ml)		none	Duplicate ID	
Glass vial (40mL)		HCl		
Plastic (60mL) - metals*		HNO3		
Plastic (60mL) - cyanide CrVI*		NaOH	Triplicate ID	
Plastic (60mL) - nutrients		H2SO4		
Plastic (500mL) - inorganics		none	Blanks	
Plastic ()			Rinsate ID	
Plastic ()				

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

Client: <u>GRR</u>		Job No: <u>J174436</u>		Well ID <u>EMB14</u>																																																																																																												
Project: <u>GME</u>		Sampled by: <u>VB</u>																																																																																																														
Location: <u>East Arm, NT</u>		Date: <u>25/5/22</u>																																																																																																														
WELL DETAILS			SAMPLING EQUIPMENT																																																																																																													
Well depth: <u>9.314</u> (m)			Device: <u>micropurge</u> <u>peristaltic</u> footvalve bailer		*Other Sampling Equipment / Method																																																																																																											
Casing diameter: <u>50</u> (mm)			Method: <u>low-flow</u> 4-well-volume purged dry																																																																																																													
Casing type: <u>PVC</u> / steel / other			WQM Make: <u>YSI</u>																																																																																																													
Depth to product (m bTOC)			WL Meter: <u>interface</u> non-interface																																																																																																													
Depth to water: <u>3.998</u> (m bTOC)			Screen (from - to), m <u>6.314 - 9.314</u>																																																																																																													
Product thickness (m)			Pump Depth (m bTOC)																																																																																																													
Field observations: eg well condition, nearby activities, weather, vegetation, etc <u>SUNNY & SLIGHT WIND</u>																																																																																																																
Purging instructions: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.																																																																																																																
Low Flow: The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart. Well volume: 50mm (2") diameter - 2 L/metre, 100mm (4") diameter - 8 L/metre, 150mm (6") diameter - 18 L/metre																																																																																																																
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13 July 2022

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George Hatzimihalis
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Global Resource Recovery
Vopak Terminal, East Arm
Northern Territory 0822

RE: GLOBAL RESOURCE RECOVERY – QUARTERLY GROUNDWATER MONITORING EVENT (JUNE 2022)

1.0 Introduction

1.1 Background

Greencap Pty Ltd (Greencap) was commissioned by Global Resource Recovery (GRR) to implement a groundwater monitoring program, inclusive of monthly, quarterly and annual monitoring events at the Vopak Terminal located at East Arm, Northern Territory (the Site).

Greencap has undertaken quarterly groundwater monitoring at the Site in accordance with the Northern Territory (NT) Environment Protection Authority (EPA) Environmental Protection Licence (EPL) 229-01 (the Licence) – attached in Appendix A. This report details the results of the June 2022 quarterly monitoring event.

This document has been prepared with the reference to the (NT EPA): *Guideline for Reporting on Environmental Monitoring, 2016*.

1.2 Monitoring Scope

The groundwater monitoring scope and analytical program are outlined in the Licence (Appendix A), inclusive of quarterly groundwater sampling from monitoring wells EMB13 and EMB14.

The results of groundwater sampling have not been compared to any criteria as there are no specific trigger values listed in the Licence. Results summary tables are included in Attachment 3.

1.3 Previous Monitoring Event

Previous quarterly monitoring events were conducted in September 2021 and December 2021. A comparison of analytical results above laboratory limits of reporting (LoRs) between the quarterly monitoring events is presented in Table 3.

2.0 Groundwater Quarterly Monitoring Event – June 2022

The quarterly monitoring event included:

- Gauging of water levels in five monitoring bores (EMB7, EMB12, EMB13, EMB14 and EMB15).
- Measurement of field parameters in two monitoring bores (EMB13 and EMB14).
- Laboratory analytical testing of samples collected from EMB13 and EMB14, including:
 - Ø Major cations and anions
 - Ø Nutrients
 - Ø Heavy metals
 - Ø Hydrocarbon compounds
 - Ø Cyanide

- Ø Glycols
- Ø Polychlorinated Biphenyls (PCBs)
- Ø Per- and polyfluoroalkyl substances (PFAS)

2.1 Sampling Methodology

All groundwater wells were sampled using an industry standard low flow groundwater sampling techniques with dedicated tubing and in accordance with AS/NZS 5667.1:1998, AS/NZS 5667.11:1998 and <https://www.waterquality.gov.au/anz-guidelines>. The flow rate was monitored and regulated using an interface probe to maintain a stable water level during purging and sampling of groundwater.

The following methodology was applied:

- Measuring standing water levels (SWLs) from the surveyed point at the top of the casings using water/product interface water level meter prior to sampling.
- Monitoring physio-chemical parameters (pH, temperature, dissolved oxygen, electrical conductivity, salinity, total dissolved solids, turbidity and oxidation-reduction potential) during purging using a calibrated water quality meter. Sampling occurred when the drawdown and these parameters had stabilised within the ranges presented in *NT Department of Mines and Energy Methodology for the Sampling of Ground Waters (2009)*.
- The sampler wore a clean pair of disposable nitrile gloves when collecting each sample.
- All groundwater samples collected in appropriate bottles/containers provided by analytical laboratories and placed in a chilled esky for transportation immediately after collection.
- Field observations were recorded during sampling including aesthetic evidence of contamination such as sheen, colour and odour.
- Collection of appropriate quality assurance/quality control (QA/QC) samples including intra- and inter-laboratory duplicates and rinsate and trip blanks.

2.2 Field Observations

Observations noted during the monitoring event were recorded on field record sheets and included groundwater colour, odours, sheens and any other anomalies. The groundwater was generally clear and no odours or sheens were noted from either bore during the monitoring.

The recorded SWLs and measured field parameters are presented in Table 1 and Table 2 respectively.

Table 1 – June 2022 Groundwater Levels

Well ID	Date	SWL			Depth of Bore (m)
		mBTOC	mBGL	mAHD	
EMB7	30/06/22	2.918	2.918	3.510	9.237
EMB12	30/06/22	2.593	2.593	3.907	9.325
EMB13	30/06/22	4.572	3.772	4.264	10.245
EMB14	30/06/22	4.85	4.15	4.405	9.803
EMB15	30/06/22	2.119	2.119	5.265	9.314

mBTOC – metres below top of casing
 mBGL – metres below ground level
 mAHD – metres Australian Height Datum

Table 2 – June 2022 Field Parameters

Well ID	pH	Temperature (°C)	Dissolved Oxygen (% saturation)	Electrical Conductivity (µS/cm)	Salinity (PSU)	Total Dissolved Solids (mg/L)	Turbidity (NTU)	ORP (mV)
EMB13	3.54	32.1	72.6	291.5	0.14	190.5	6.14	68.5
EMB14	6.30	33.0	59.8	238.5	0.11	154.7	6.61	80.4

Field records are presented in Attachment 2.

2.3 Analytical Results

Groundwater samples were analysed at National Association of Testing Authorities (NATA) - accredited laboratories (Eurofins – primary, ALS – secondary).

The results are included in Attachment 3 and are summarised below in Table 3. Laboratory certificates of analysis are included in Appendix B.

Table 3 – Analytical Results Summary Above Laboratory Limits of Reporting (LOR)

Parameter	Date	Unit of Measurement	LOR	Range of Analytical Results	
				EMB13	EMB14
Nutrients & Inorganics					
Total Phosphate (as P)	23/09/21	µg/L	10	<10	20
	17/12/21	µg/L		10	20
	30/06/22	µg/L		<10	<10
Total Nitrogen	23/09/21	µg/L	200	6,300	11,200
	17/12/21	µg/L		5,000	15,800
	30/06/22	µg/L		8,700	12,500
Kjeldahl Nitrogen Total	23/09/21	µg/L	200	500	1,500
	17/12/21	µg/L		<200	800
	30/06/22	µg/L		4,000	6,200
Oxides of Nitrogen	23/09/21	µg/L	50	5,000	9,700
	17/12/21	µg/L		5,000	15,000
	30/06/22	µg/L		4,700	6,300
Ammonia (as N)	23/09/21	µg/L	10	90	90
	17/12/21	µg/L		30	<10
	30/06/22	µg/L		<10	240
Cyanide (total)	23/09/21	µg/L	5	6	<5
	17/12/21	µg/L		110	38
	30/06/22	µg/L		<5	<5

Parameter	Date	Unit of Measurement	LOR	Range of Analytical Results	
				EMB13	EMB14
Anions					
Chloride	23/09/21	µg/L	1,000	77,000	67,000
	17/12/21	µg/L		45,000	6,100
	30/06/22	µg/L		45,000	19,000
Sulphate (as SO ₄)	23/09/21	µg/L	5,000	<5,000	<5,000
	17/12/21	µg/L		5,300	14,000
	30/06/22	µg/L		<5,000	<5,000
Total Alkalinity (as CaCO ₃)	23/09/21	µg/L	20,000	<20,000	<20,000
	17/12/21	µg/L		<20,000	26,000
	30/06/22	µg/L		<20,000	32,000
Cations					
Calcium	23/09/21	µg/L	500	1,000	12,000
	17/12/21	µg/L		1,000	28,000
	30/06/22	µg/L		1,200	14,000
Magnesium	23/09/21	µg/L	500	800	2,300
	17/12/21	µg/L		700	1,700
	30/06/22	µg/L		600	1,400
Potassium	23/09/21	µg/L	500	1,000	3,600
	17/12/21	µg/L		1,100	3,200
	30/06/22	µg/L		2,200	3,100
Sodium	23/09/21	µg/L	500	18,000	18,000
	17/12/21	µg/L		18,000	3,800
	30/06/22	µg/L		20,000	6,700
Heavy Metals (filtered)					
Arsenic	23/09/21	µg/L	1	<1	<1
	17/12/21	µg/L		1	<1
	30/06/22	µg/L		1	<1
Barium	23/09/21	µg/L	1	51	213
	17/12/21	µg/L		50	363
	30/06/22	µg/L		50	224
Boron	23/09/21	µg/L	50	<50	<50
	17/12/21	µg/L		50	<50
	30/06/22	µg/L		60	<50
Copper	23/09/21	µg/L	1	3	<1
	17/12/21	µg/L		3	4
	30/06/22	µg/L		3	<1

Parameter	Date	Unit of Measurement	LOR	Range of Analytical Results	
				EMB13	EMB14
Lead	23/09/21	µg/L	1	2	<1
	17/12/21	µg/L		<1	<1
	30/06/22	µg/L		2	<1
Manganese	23/09/21	µg/L	1	35	12
	17/12/21	µg/L		29	3
	30/06/22	µg/L		29	3
Nickel	23/09/21	µg/L	1	<1	<1
	17/12/21	µg/L		1	1
	30/06/22	µg/L		2	<1
Zinc	23/09/21	µg/L	5	30	109
	17/12/21	µg/L		30	799
	30/06/22	µg/L		15	250
PFAS					
Sum of PFAS (n=30)	23/09/21	µg/L	0.1	55.49	4.45
	17/12/21	µg/L		14.23	1.1
	30/06/22	µg/L		150.5	2.39

The results for the June 2022 quarterly monitoring event are summarised as follows:

- Heavy metals (antimony, beryllium, cadmium, chromium, cobalt, lead, mercury, selenium and vanadium (all filtered)), total phosphate, cyanide, sulphate, hydroxide alkalinity as CaCO₃, carbonate alkalinity as CaCO₃, total recoverable hydrocarbons (TRH), polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCBs), phenols, glycols and organochlorine pesticides (OCP) were all reported to be below the LoRs for both monitoring bores.
- Several nutrients and organics, chloride, calcium, magnesium, potassium, sodium and filtered heavy metals (barium, manganese and zinc) were reported above the LoRs in both monitoring bores.
- Boron, copper, lead, nickel were reported above LoRs in EMB13 and ammonia, bicarbonate alkalinity as CaCO₃ and total alkalinity as CaCO₃ were reported above LoRs in EMB14.
- A range of Per- and Polyfluoroalkyl Substances (PFAS) were detected in both monitoring bores. There was a significant increase in reported concentrations for the sum of PFAS in EMB13 between the December 2021 and June 2022 quarterly monitoring events.

2.4 QA/QC Results

Groundwater Duplicate Analysis

Field duplicates (QC01 and QC01A, duplicates of EMB13) were collected during the monitoring event and analysed at the intra (Eurofins) and inter (ALS) laboratories for benzene, toluene, ethylbenzene, xylene, naphthalene, TRH, PAH and phenols.

Duplicate analytical results were assessed by calculating relative percent differences between primary sample results and duplicate sample results. All of the inter and intra laboratory duplicate groundwater analyses had RPD values below the recommended comparison criteria of 50%.

A table summarising the duplicate sample results is presented at the end of this report (refer to Attachment 3).

Blank Analyses

Rinsate blank samples (RB01) was collected on 30 June 2022 and analysed at the primary laboratory for TRH and BTEXN. The rinsate blank samples were collected from decontaminated sampling equipment to ensure adequate cleaning has occurred.

A trip blank sample (TB01) was prepared and kept with the portable sample cooler for the duration of the and delivered to the primary laboratory for TRH and BTEXN analysis. The trip blanks were prepared using de-ionised water to detect potential cross-contamination throughout the sampling and sample delivery stages of the monitoring event.

A table summarising the rinsate and trip blanks sample results is presented at the end of this report (refer to Attachment 3).

3.0 Conclusions

Greencap conducted a quarterly groundwater monitoring event at the Vopak Terminal at East Arm in accordance with EPL229-01 in June 2022. Physico-chemical groundwater parameters were measured in the field and samples were collected from the two monitoring bores (EM13 and EMB14) and submitted to NATA-accredited laboratories for analytical testing.

Many analytes including filtered metals (antimony, beryllium, cadmium, chromium, cobalt, lead, mercury, selenium and vanadium), total phosphate, cyanide, sulphate, hydroxide alkalinity as CaCO_3 , carbonate alkalinity as CaCO_3 , total recoverable hydrocarbons, polycyclic aromatic hydrocarbons, polychlorinated biphenyls, phenols, glycols and organochlorine pesticides were reported to be below the laboratory limits of reporting in both monitoring bores.

Several nutrients and organics, chloride, calcium, magnesium, potassium, sodium and filtered heavy metals – barium, manganese and zinc were reported above the laboratory limits of reporting in both monitoring bores.

Boron, copper, lead, nickel were reported above laboratory limits of reporting in EMB13 and ammonia, bicarbonate alkalinity as CaCO_3 and total alkalinity as CaCO_3 were reported above laboratory limits of reporting in EMB14.

A range of Per- and Polyfluoroalkyl Substances (PFAS) were detected in both monitoring bores. There was a significant increase in reported concentrations for the sum of PFAS in EMB13 between the December 2021 and June 2022 quarterly monitoring events

The next quarterly groundwater monitoring event is scheduled to occur in September 2022.

Attachments

- 1 Statements of Limitation
- 2 Field Record Sheets
- 3 Results Summary Tables (including QA/QC)

Appendices

- A Environmental Protection Licence 229-01
- B Laboratory Certificates of Analysis

Yours Sincerely,



Varun Bhagwat
Environmental Consultant - NT
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Groundwater Monitoring Event – June 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 1: Statements of Limitation

Statements of Limitation

All and any Services proposed by Greencap to the Client were subject to the Terms and Conditions listed on the Greencap website at: <https://www.greencap.com.au/terms-conditions> Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap does not agree to any alternative terms or variation of these terms if subsequently proposed by the Client. The Services were carried out in accordance with the current and relevant industry standards of testing, interpretation and analysis. The Services were carried out in accordance with Commonwealth, State, Territory or Government legislation, regulations and/or guidelines. The Client was deemed to have accepted these Terms when the Client signed the Proposal (where indicated) or when the Company commenced the Services at the request (written or otherwise) of the Client.

The services were carried out for the Specific Purpose, outlined in the body of the Proposal. To the fullest extent permitted by law, Greencap, its related bodies corporate, its officers, consultants, employees and agents assume no liability, and will not be liable to any person, or in relation to, any losses, damages, costs or expenses, and whether arising in contract, tort including negligence, under statute, in equity or otherwise, arising out of, or in connection with, any matter outside the Specific Purpose.

The Client acknowledged and agreed that proposed investigations were to rely on information provided to Greencap by the Client or other third parties. Greencap made no representation or warranty regarding the completeness or accuracy of any descriptions or conclusions based on information supplied to it by the Client, its employees or other third parties during provision of the Services. Under no circumstances shall Greencap have any liability for, or in relation to, any work, reports, information, plans, designs, or specifications supplied or prepared by any third party, including any third party recommended by Greencap. The Client releases and indemnifies Greencap from and against all Claims arising from errors, omissions or inaccuracies in documents or other information provided to Greencap by the Client, its employees or other third parties.

The Client was to ensure that Greencap had access to all information, sites and buildings as required by or necessary for Greencap to undertake the Services. Notwithstanding any other provision in these Terms, Greencap will have no liability to the Client or any third party to the extent that the performance of the Services was not able to be undertaken (in whole or in part) due to access to any relevant sites or buildings being prevented or delayed due to the Client or their respective employees or contractors expressing safety or health concerns associated with such access.

Unless otherwise expressly agreed to in writing and signed by Greencap, Greencap, its related bodies corporate, its officers, employees and agents assume no liability and will not be liable for lost profit, revenue, production, contract, opportunity, loss arising from business interruption or delay, indirect or consequential loss or loss to the extent caused or contributed to by the Client or third parties, suffered or incurred arising out of or in connection with our Proposals, Reports, the Project or the Agreement. In the event Greencap is found by a Court or Tribunal to be liable to the Client for any loss or damage arising in connection with the Services, the Client's entitlement to recover damages from Greencap shall be reduced by such amount as reflects the extent to which any act, default, omission or negligence of the Client, or any third party, caused or contributed to such loss or damage. Unless otherwise agreed in writing and signed by both parties, Greencap's total aggregate liability will not exceed the total consulting fees paid by the client in relation to this Proposal. For further detail, see Greencap's Terms and Conditions available at <https://www.greencap.com.au/terms-conditions>

The Report is provided for the exclusive use of the Client and for this Project only, in accordance with the Scope and Specific Purpose as outlined in the Agreement, and only those third parties who have been authorized in writing by Greencap. It should not be used for other purposes, other projects or by a third party unless otherwise agreed and authorized in writing by Greencap. Any person relying upon this Report beyond its exclusive use and Specific Purpose, and without the express written consent of Greencap, does so entirely at their own risk and without recourse to Greencap for any loss, liability or damage. To the extent permitted by law, Greencap assumes no responsibility for any loss, liability, damage, costs or expenses arising from interpretations or conclusions made by others, or use of the Report by a third party. Except as specifically agreed by Greencap in writing, it does not authorize the use of this Report by any third party. It is the responsibility of third parties to independently make inquiries or seek advice in relation to their particular requirements and proposed use of the site.

The conclusions, or data referred to in this Report, should not be used as part of a specification for a project without review and written agreement by Greencap. This Report has been written as advice and opinion, rather than with the purpose of specifying instructions for design or redevelopment. Greencap does not purport to recommend or induce a decision to make (or not make) any purchase, disposal, investment, divestment, financial commitment or otherwise in relation to the site it investigated.

This Report should be read in whole and should not be copied in part or altered. The Report as a whole set outs the findings of the investigations. No responsibility is accepted by Greencap for use of parts of the Report in the absence (or out of context) of the balance of the Report.



Groundwater Monitoring Event – June 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 2: Field Record Sheets

Water Level Dipper Type (interphase, length etc): 1P

Observations / Comments:
Weather Conditions (e.g. cloudy, sunny, windy etc), Pumping, etc

CLOUDY, WINDY, COOL RAINED ON 29/6/22

Groundwater Sampling Record

Client: <u>GRR</u>		Job No: <u>J174436</u>		Well ID <u>EMB13</u>
Project: <u>GME</u>		Sampled by: <u>VB</u>		
Location: <u>East Arm, NT</u>		Date: <u>30-Jun-22</u>		
WELL DETAILS		SAMPLING EQUIPMENT		
Well depth: <u>9.314</u> ~~10.245~~ (m)	Device: <u>micropurge</u> <u>peristaltic</u> footvalve bailer	*Other Sampling Equipment / Method		
Casing diameter: <u>50</u> (mm)	Method: <u>low-flow</u> 4-well-volume purged dry			
Casing type: <u>PVC</u> steel / other	WQM Make: <u>YSI</u>			
Depth to product (m bTOC)	WL Meter: <u>interface</u> non-interface			
Depth to water: <u>4.572</u> (m bTOC)	Screen (from - to), m <u>7.245</u> ~~10.245~~ <u>6.314</u> ~~9.314~~			
Product thickness (m)	Pump Depth (m bTOC)			

Field observations: eg. well condition, nearby activities, weather, vegetation, etc

CLOUDY, WINDY, COOL, RAINED A LITTLE YESTERDAY

Purging instructions:

Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume

The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre; 100mm (4") diameter - 8 L/metre, 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment		
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond <u>µS/cm</u> / mS/cm	ORP mV	DO mg/L / ppm / %	Turbidity, Colour, Odour, Sheen, etc		
								TDS mg/L	SAL PSU	TURB NTU
0907	1.27	4.572	31.3	3.51	335.8	72.7	14.3	200.2	0.14	
0910	2	5.419	32.0	3.50	302.2	63.0	51.5	196.3	0.14	
0913	4	5.803	32.1	3.49	298.1	60.0	53.5	193.05	0.14	
0916	6	6.056	32.1	3.55	287.5	57.9	54.7	187.85	0.14	
0919	8	6.243	32.1	3.65	279.7	57.5	55.9	181.35	0.13	
0922	10	6.455	32.1	3.58	285.7	60.1	62.8	185.25	0.13	
0928	12	6.666	32.1	3.56	290.5	62.6	68.7	188.50	0.14	
0931	14	6.861	32.1	3.54	291.3	65.6	70.5	184.80	0.14	
0934	16	7.091	32.1	3.54	291.5	68.5	72.6	190.45	0.14	6.14

Observations during Sampling: eg. odours, sheens, turbidity, water colour, etc

SAMPLED AFTER 16 L PURGED
L-M TURB, CLEAR, NO SHEEN / ODOUR

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments
Glass amber (100-250ml)	2	none		
Glass vial (40mL)	2	HCl	Duplicate ID <u>Q101</u> - 1x AMBER 2x VIAL	
Plastic (60mL) - metals*	1	HNO3		
Plastic (60mL) - cyanide, CrVI*	1	NaOH	Triplicate ID <u>Q101A</u> - 1x AMBER	
Plastic (60mL) - nutrients	1	H2SO4		
Plastic (500mL) - inorganics	1	none	Blanks	2 x VIAL
Plastic () <u>PFA</u>	1		Rinsate ID	
Plastic () <u>ACVCL</u>	2		<u>LAB01</u> - 1x AMBER, 2x VIAL	
			<u>TAB01</u> - 2x VIAL	

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

Client: <u>GRR</u>	Job No: <u>J174436</u>	Well ID <u>EMB14</u>
Project: <u>GME</u>	Sampled by: <u>VB</u>	
Location: <u>East Arm, NT</u>	Date: <u>30-Jun-22</u>	

WELL DETAILS		SAMPLING EQUIPMENT		*Other Sampling Equipment / Method
Well depth: <u>10.245</u> (m)	Device: <u>micropurge</u> <u>peristaltic</u> footvalve bailer			
Casing diameter: <u>50</u> (mm)	Method: <u>low-flow</u> 4-well-volume purged dry			
Casing type: <u>PVC</u> / steel / other	WQM Make: <u>YSI</u>			
Depth to product (m bTOC)	WL Meter: <u>interface</u> non-interface			
Depth to water: <u>4.850</u> (m bTOC)	Screen (from - to), m <u>7.245 - 10.245</u>			
Product thickness (m)	Pump Depth (m bTOC)			

Field observations: eg. well condition, nearby activities, weather, vegetation, etc

WINDY, CLOUDY, COOL, RAINED A LITTLE ON 29/6/22.
SLIGHT DRIZZLE

Purging instructions:

Low Flow: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume: The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.

Well volume: 50mm (2") diameter - 2 L/metre; 100mm (4") diameter - 8 L/metre; 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment Turbidity, Colour, Odour, Sheen, etc
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond $\mu\text{S/cm}$ / mS/cm	ORP mV	DO mg/L / ppm / %	
1007	1 NT	4.850	32.6	6.23	248.9	77.5	6.7	162.50 0.12
1010	2	5.656	33.0	6.22	248.5	81.0	10.5	161.20 0.12
1013	4	6.178	33.0	6.29	239.4	81.2	35.3	155.35 0.11
1016	6	6.809	33.0	6.33	240.2	81.6	53.5	156.65 0.11
1020	8	7.164	32.9	6.36	242.1	81.4	55.5	157.30 0.11
1024	10	7.163	33.0	6.33	239.8	80.8	58.7	156.00 0.11
1027	12	7.163	33.0	6.30	238.5	80.4	59.8	154.70 0.11 6.61
		SAMPLED						

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc

SAMPLED AFTER 12 L PURGED

L-M TURB, CLEAR, NO SHEEN/ODOUR

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments
Glass amber (100-250ml)	2	none	Duplicate ID	
Glass vial (40mL)	2	HCl	Triplicate ID	
Plastic (60mL) - metals*	1	HNO3	Blanks	
Plastic (60mL) - cyanide CrVI*	1	NaOH	Rinsate ID	
Plastic (60mL) - nutrients	1	H2SO4		
Plastic (500mL) - inorganics	1	none		
Plastic () <u>PPAS</u>	1			
Plastic () <u>4x400s</u>	2			

*samples for dissolved metals to be filtered in the field prior to filling sampling container



Groundwater Monitoring Event – June 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Attachment 3: Results Summary Tables (including QA/QC)

GRR
Quarterly Groundwater Monitoring Results Table
September 2021 to June 2022

				SWL	Field Parameters								Metals															
				Standing Water Level	Temperature	pH	Electrical Conductivity	Salinity	ORP	Dissolved Oxygen	Total Dissolved Solids	Turbidity	Antimony (Filtered)	Arsenic (Filtered)	Barium (filtered)	Beryllium (Filtered)	Boron (filtered)	Cadmium (Filtered)	Chromium (total) (Filtered)	Cobalt (Filtered)	Copper (Filtered)	Lead (Filtered)	Manganese (Filtered)	Mercury (Filtered)	Nickel (Filtered)	Selenium (Filtered)	Vanadium (Filtered)	Zinc (Filtered)
EQL				mbgl	°C	pH unit	(µS/cm)	PSU	mV	% Sat.	mg/L	NTU	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
													1	1	1	1	50	0.1	1	1	1	1	1	0.1	1	10	10	5
Monitoring Round	Field ID	Sampled Date	Lab Reports																									
Sep-21	EMB13	23/09/2021	827604 & ES2134300	5.803	36.8	7.24	281.3	0.13	-35.2	32.7	183.09	3.91	<1	<1	51	<1	<50	<0.2	<1	<1	3	2	35	<0.1	<1	1	<10	30
	EMB14			6.465	33.3	5.41	377.6	0.18	93.2	18.4	250.26	6.09	<1	<1	213	<1	<50	<0.2	<1	<1	<1	<1	12	<0.1	<1	<1	<10	109
Dec-21	EMB13	17/12/2021	852254, ESM2126049 & ES2146552	3.276	33.4	3.75	272.4	0.13	99.4	22.1	176.8	4.75	<1	1	50	<1	50	<1	<1	<1	3	<1	29	<0.1	1	10	<10	30
	EMB14			3.416	35.1	6.39	204.7	0.09	68	33	122.6	5.81	<1	<1	363	<1	<50	<1	<1	<1	4	<1	3	<0.1	1	10	<10	799
Jun-22	EMB13	30/06/2022	901960 & ES2222495	4.572	32.1	3.54	291.5	0.14	68.5	72.6	190.45	6.14	<1	1	50	<1	60	<0.1	<1	<1	3	2	29	<0.1	2	<10	<10	15
	EMB14			4.850	33.0	6.3	238.5	0.11	80.4	59.8	154.7	6.61	<1	<1	224	<1	<50	<0.1	<1	<1	<1	<1	3	<0.1	<1	<10	<10	250

GRR
Quarterly Groundwater Monitoring Results Table
September 2021 to June 2022

Greencap Project No.: J174436

				Inorganics						Anions						Cations				TRH - NEPM 1999 Fractions						TRH - NEPM 2013 Fractions							
				Ammonium Ion (as N)	Nitrate + Nitrite (oxides of nitrogen) (as N)	Nitrogen (Total)	Kjeldahl Nitrogen Total	Phosphate total (P)	Cyanide (total)	Chloride	Sulphate (as SO4)	Carbonate Alkalinity (as CaCO3)	Bicarbonate Alkalinity (as CaCO3)	Hydroxide Alkalinity (as CaCO3)	Total Alkalinity (as CaCO3)	Calcium	Magnesium	Potassium	Sodium	C6 - C9	C10 - C14	C15 - C28	C29-C36	+C10 - C36 (Sum of total)	Naphthalene	C6-C10	C6-C10 less BTEX (F1)	C10-C16	C10-C16 less NAPHTHALENE	C16-C34	C34-C40	C10 - C40 (Sum of total)	
EQL	10	50	200	200	10	5	1000	5000	10000	2000	20000	20000	500	500	500	500	20	50	100	100	100	1	20	20	50	50	100	100	100				
Monitoring Round	Field ID	Sampled Date	Lab Reports																														
Sep-21	EMB13	23/09/2021	827604 & ES2134300	90	5800	6300	500	<10	6	77000	<5000	<10000	<20000	<20000	<20000	1000	800	1000	18000	<20	<50	<100	<100	<100	<10	<20	<20	<50	<50	<100	<100	<100	
	EMB14			90	9700	11200	1500	20	<5	67000	<5000	<10000	<20000	<20000	<20000	12000	2300	3600	18000	<20	<50	<100	<100	<100	<10	<20	<20	<50	<50	<100	<100	<100	
Dec-21	EMB13	17/12/2021	852254, ESM2126049 & ES2146552	30	5000	5000	<200	10	110	45000	5300	<10000	<20000	<20000	<20000	1000	700	1100	18000	<20	<50	<100	<100	<100	<10	<20	<20	<50	<50	<100	<100	<100	
	EMB14			<10	15000	15800	800	20	38	6100	14000	<10000	26000	<20000	26000	28000	1700	3200	3800	<20	<50	<100	<100	<100	<10	<20	<20	<50	<50	<100	<100	<100	
Jun-22	EMB13	30/06/2022	901960 & ES2222495	<10	4700	8700	4000	<10	<5	45000	<5000	<10000	<20000	<20000	<20000	1200	600	2200	20000	<20	<50	<100	<100	<100	<10	<20	<20	<50	<50	<100	<100	<100	
	EMB14			240	6300	12500	6200	<10	<5	19000	<5000	<10000	32000	<20000	32000	14000	1400	3100	6700	<20	<50	<100	<100	<100	<10	<20	<20	<50	<50	<100	<100	<100	

GRR
Quarterly Groundwater Monitoring Results Table
September 2021 to June 2022

				MAH								PAH																			
				Benzene	Ethylbenzene	Isopropyl benzene (cumene)	Styrene	Toluene	Xylene (m & p)	Xylene (o)	Xylene Total	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo[b+i]fluoranthene	Benzo[g,h,i]perylene	Benzo[k]fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Sum of total)			
EQL				1	1	1	1	1	2	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
Monitoring Round	Field ID	Sampled Date	Lab Reports																												
Sep-21	EMB13	23/09/2021	827604 & ES2134300	<1	<1	<1	<1	<1	<2	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1					
	EMB14			<1	<1	<1	<1	<1	<2	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1				
Dec-21	EMB13	17/12/2021	852254, ESM2126049 & ES2146552	<1	<1	<1	<1	<1	<2	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1					
	EMB14			<1	<1	<1	<1	<1	<2	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1				
Jun-22	EMB13	30/06/2022	901960 & ES2222495	<1	<1	<1	<1	<1	<2	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1					
	EMB14			<1	<1	<1	<1	<1	<2	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1				

GRR
Quarterly Groundwater Monitoring Results Table
September 2021 to June 2022

Greencap Project No.: J174436

				PCBs								Phenols (Halogenated)								Phenols (non-Halogenated)								Glycols							
				Aroclor-1016	Aroclor-1221	Aroclor-1232	Aroclor-1242	Aroclor-1248	Aroclor-1254	Aroclor-1260	Total PCB*	2-Chlorophenol	2,4-Dichlorophenol	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,6-Dichlorophenol	4-Chloro-3-methylphenol	Pentachlorophenol	Tetrachlorophenols - Total	Total Halogenated Phenol*	2-Cyclohexyl-4,6-dinitrophenol	2-Methyl-4,6-dinitrophenol	2-Methylphenol (o-Cresol)	2-Nitrophenol	2,4-Dimethylphenol	2,4-Dinitrophenol	3&4-Methylphenol (m&p-Cresol)	4-Nitrophenol	Dinoseb	Phenol	Total Non-Halogenated Phenol*	Di-Ethylene Glycol	Ethylene glycol	Propylene glycol	Triethylene glycol
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL				1	1	1	1	1	1	1	1	3	3	10	10	3	10	10	30	10	100	30	3	10	3	30	6	30	100	3	100	20000	20000	20000	20000
Monitoring Round	Field ID	Sampled Date	Lab Reports																																
Sep-21	EMB13	23/09/2021	827604 & ES2134300	<1	<1	<1	<1	<1	<1	<1	<1	<3	<3	<10	<10	<3	<10	<10	<3	<10	<100	<30	<3	<10	<3	<30	<6	<30	<100	<3	<100	<20000	<20000	<20000	<20000
	EMB14			<1	<1	<1	<1	<1	<1	<1	<1	<1	<3	<3	<10	<10	<3	<10	<10	<3	<10	<100	<30	<3	<10	<3	<30	<6	<30	<100	<3	<100	<20000	<20000	<20000
Dec-21	EMB13	17/12/2021	852254, ESM2126049 & ES2146552	<1	<1	<1	<1	<1	<1	<1	<1	<3	<3	<10	<10	<3	<10	<10	<3	<10	<100	<30	<3	<10	<3	<30	<6	<30	<100	<3	<100	<20000	<20000	<20000	<20000
	EMB14			<1	<1	<1	<1	<1	<1	<1	<1	<1	<3	<3	<10	<10	<3	<10	<10	<3	<10	<100	<30	<3	<10	<3	<30	<6	<30	<100	<3	<100	<20000	<20000	<20000
Jun-22	EMB13	30/06/2022	901960 & ES2222495	<1	<1	<1	<1	<1	<1	<1	<1	<3	<3	<10	<10	<3	<10	<10	<3	<10	<100	<30	<3	<10	<3	<30	<6	<30	<100	<3	<100	<20000	<20000	<20000	<20000
	EMB14			<1	<1	<1	<1	<1	<1	<1	<1	<1	<3	<3	<10	<10	<3	<10	<10	<3	<10	<100	<30	<3	<10	<3	<30	<6	<30	<100	<3	<100	<20000	<20000	<20000

GRR
Quarterly Groundwater Monitoring Results Table
September 2021 to June 2022

				PFAS - Perfluoroalkyl carboxylic acids (PFCAs)											PFAS - Perfluoroalkyl sulfonamido substances							PFAS - Perfluoroalkyl sulfonic acids (PFSAs)							
				Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoDA)	Perfluorotridecanoic acid (PFTriDA)	Perfluorotetradecanoic acid (PFTeDA)	2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	N-ethyl-perfluorooctanesulfonamidacetic acid (N-EtFOSAA)	N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	N-methyl-perfluorooctanesulfonamidacetic acid (N-MeFOSAA)	Perfluorooctane sulfonamide (FOSA)	Perfluorobutanesulfonic acid (PFBS)	Perfluorononanesulfonic acid (PFNS)	Perfluoropropanesulfonic acid (PFPrS)	Perfluoropentanesulfonic acid (PFPeS)	Perfluorohexanesulfonic acid (PFHxS)	Perfluoroheptanesulfonic acid (PFHpS)	Perfluorooctanesulfonic acid (PFOS)	Perfluorodecanesulfonic acid (PFDS)
EQL				0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Monitoring Round	Field ID	Sampled Date	Lab Reports																										
Sep-21	EMB13	23/09/2021	827604 & ES2134300	1	5.5	5.4	1.7	1.2	0.04	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	EMB14			0.56	1.4	1.1	1.0	0.29	0.1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01
Dec-21	EMB13	17/12/2021	852254, ESM2126049 & ES2146552	0.8	4.5	3.8	1.4	0.97	0.03	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	EMB14			0.17	0.28	0.21	0.27	0.09	0.08	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01
Jun-22	EMB13	30/06/2022	901960 & ES2222495	2.6	14	13	4.7	3.1	0.39	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	EMB14			0.23	0.77	0.49	0.47	0.15	0.15	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01

GRR
Quarterly Groundwater Monitoring Results Table
September 2021 to June 2022

				PFAS - n:2 Fluorotelomer sulfonic acids (n:2 FTSA)				PFASs Summations				
				1H,1H,2H,2H-perfluorohexanesulfonic acid (4:2 FTSA)	1H,1H,2H,2H-perfluorooctanesulfonic acid (6:2 FTSA)	1H,1H,2H,2H-perfluorododecanesulfonic acid (8:2 FTSA)	1H,1H,2H,2H-perfluorododecanesulfonic acid (10:2 FTSA)	Sum (PFHxS + PFOS)	Sum of US EPA PFAS (PFOS + PFOA)	Sum of enHealth PFAS (PFHxS + PFOS + PFOA)	Sum of WA DWER PFAS (n=10)	Sum of PFASs (n=30)
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL				0.01	0.05	0.01	0.01	0.01	0.01	0.01	0.05	0.1
Monitoring Round	Field ID	Sampled Date	Lab Reports									
Sep-21	EMB13	23/09/2021	827604 & ES2134300	0.04	40	61	< 0.01	<0.01	1.2	1.2	55.41	55.49
	EMB14			<0.01	<0.05	<0.01	< 0.01	<0.01	0.29	0.29	4.35	4.45
Dec-21	EMB13	17/12/2021	852254, ESM2126049 & ES2146552	0.03	1.6	1.1	< 0.01	<0.01	0.97	0.97	14.17	14.23
	EMB14			<0.01	<0.05	<0.01	< 0.01	<0.01	0.09	0.09	1.02	1.1
Jun-22	EMB13	30/06/2022	901960 & ES2222495	0.1	110	2.6	< 0.01	<0.01	3.1	3.1	150	150.49
	EMB14			<0.01	0.11	0.02	< 0.01	<0.01	0.15	0.15	2.24	2.39

GRR
Quarterly Groundwater Monitoring
Relative Percentage Duplicate Results Table
June 2022

Greencap Project No.: J174436

			Lab Report Number Field ID Sampled Date/Time	901960 EMB13 30/06/2022	901960 QC01 30/06/2022	RPD	901960 EMB13 30/06/2022	ES2222495 QC01A 30/06/2022	RPD
Chem_Group	ChemName	Units	EQL						
BTEX	Benzene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Ethylbenzene	µg/l	1 (Primary): 2 (Interlab)	<1.0	<1.0	0	<1.0	<2.0	0
	Toluene	µg/l	1 (Primary): 2 (Interlab)	<1.0	<1.0	0	<1.0	<2.0	0
	Xylene (m & p)	µg/l	2	<2.0	<2.0	0	<2.0	<2.0	0
	Xylene (o)	µg/l	1 (Primary): 2 (Interlab)	<1.0	<1.0	0	<1.0	<2.0	0
	Xylene Total	µg/l	3 (Primary): 2 (Interlab)	<3.0	<3.0	0	<3.0	<2.0	0
	C6-C10 less BTEX (F1)	mg/l	0.02	<0.02	<0.02	0	<0.02	<0.02	0
Halogenated Phenols	2,4,5-trichlorophenol	µg/l	10 (Primary): 1 (Interlab)	<10.0	<10.0	0	<10.0	<1.0	0
	2,4,6-trichlorophenol	µg/l	10 (Primary): 1 (Interlab)	<10.0	<10.0	0	<10.0	<1.0	0
	2,4-dichlorophenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	2,6-dichlorophenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	2-chlorophenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	Pentachlorophenol	µg/l	10 (Primary): 2 (Interlab)	<10.0	<10.0	0	<10.0	<2.0	0
	tetrachlorophenols	µg/l	30	<30.0	<30.0	0	<30.0		
Herbicides	Dinoseb	µg/l	100	<100.0	<100.0	0	<100.0		
PAH	Benzo(b+j)fluoranthene	mg/l	0.001	<0.001	<0.001	0	<0.001	<0.001	0
PAH/Phenols	2,4-dimethylphenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	2,4-dinitrophenol	mg/l	0.03	<0.03	<0.03	0	<0.03		
	2-methylphenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	2-nitrophenol	µg/l	10 (Primary): 1 (Interlab)	<10.0	<10.0	0	<10.0	<1.0	0
	3-&4-methylphenol	µg/l	6 (Primary): 2 (Interlab)	<6.0	<6.0	0	<6.0	<2.0	0
	4,6-Dinitro-2-methylphenol	µg/l	30	<30.0	<30.0	0	<30.0		
	4-chloro-3-methylphenol	µg/l	10 (Primary): 1 (Interlab)	<10.0	<10.0	0	<10.0	<1.0	0
	4-nitrophenol	µg/l	30	<30.0	<30.0	0	<30.0		
	Acenaphthene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Acenaphthylene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Anthracene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Benzo(a)anthracene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Benzo(a) pyrene	µg/l	1 (Primary): 0.5 (Interlab)	<1.0	<1.0	0	<1.0	<0.5	0
	Benzo(g,h,i)perylene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Benzo(k)fluoranthene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Chrysene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Cresol Total	mg/l	0.01	<0.01	<0.01	0	<0.01		
	Dibenz(a,h)anthracene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Fluoranthene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Fluorene	µg/l	1	<1.0	<1.0	0	<1.0		
	Indeno(1,2,3-c,d)pyrene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Naphthalene	µg/l	10 (Primary): 5 (Interlab)	<10.0	<10.0	0	<10.0	<5.0	0
	Naphthalene	µg/l	1 (Primary): 5 (Interlab)	<1.0	<1.0	0	<1.0	<5.0	0
	PAHs (Sum of total)	µg/l	1 (Primary): 0.5 (Interlab)	<1.0	<1.0	0	<1.0	<0.5	0
Phenolics	Phenanthrene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
	Phenol	µg/l	3 (Primary): 1 (Interlab)	<3.0	<3.0	0	<3.0	<1.0	0
	Pyrene	µg/l	1	<1.0	<1.0	0	<1.0	<1.0	0
Phenolics	4,6-Dinitro-o-cyclohexyl phenol	µg/l	100	<100.0	<100.0	0	<100.0		
	Phenols (Total Halogenated)	mg/l	0.01	<0.01	<0.01	0	<0.01		
	Phenols (Total Non Halogenated)	mg/l	0.1	<0.1	<0.1	0	<0.1		
TPH	C10-C16	mg/l	0.05 (Primary): 0.1 (Interlab)	<0.05	<0.05	0	<0.05	<0.1	0
	C16-C34	mg/l	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	C34-C40	mg/l	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	F2-NAPHTHALENE	mg/l	0.05 (Primary): 0.1 (Interlab)	<0.05	<0.05	0	<0.05	<0.1	0
	+C10 - C36 (Sum of total)	µg/l	100 (Primary): 50 (Interlab)	<100.0	<100.0	0	<100.0	<50.0	0
	C6 - C9	µg/l	20	<20.0	<20.0	0	<20.0	<20.0	0
	C10 - C14	µg/l	50	<50.0	<50.0	0	<50.0	<50.0	0
	C15 - C28	µg/l	100	<100.0	<100.0	0	<100.0	<100.0	0
	C29-C36	µg/l	100 (Primary): 50 (Interlab)	<100.0	<100.0	0	<100.0	<50.0	0
	C10 - C40 (Sum of total)	µg/l	100	<100.0	<100.0	0	<100.0	<100.0	0
	C6-C10	mg/l	0.02	<0.02	<0.02	0	<0.02	<0.02	0

			Lab Report Number	901960	901961
			Field ID	RB01	TB01
			Sampled_Date/Time	30/06/2022	30/06/2022
			Sample Type	Rinsate	Trip_B
Chem_Group	ChemName	Units	EQL		
	Perfluorooctanoate	mg/l	0.00001		
BTEX	Benzene	µg/L	1	<1	<1
	Ethylbenzene	µg/L	1	<1	<1
	Toluene	µg/l	1	<1	<1
	Total BTEX	mg/l	0.001		
	Xylene (m & p)	µg/l	2	<2	<2
	Xylene (o)	µg/l	1	<1	<1
	Xylene Total	µg/l	2	<3	<3
	C6-C10 less BTEX (F1)	mg/l	0.02	<0.02	<0.02
	Naphthalene	µg/l	1	<10	<10
TPH	C10-C16	mg/l	0.05	<0.05	
	C16-C34	mg/l	0.1	<0.1	
	C34-C40	mg/l	0.1	<0.1	
	F2-NAPHTHALENE	mg/l	0.05	<0.05	
	+C10 - C36 (Sum of total)	µg/l	50	<100	
	C6 - C9	µg/L	20	<20	<20
	C10 - C14	µg/l	50	<50	
	C15 - C28	µg/l	100	<100	
	C29-C36	µg/L	50	<100	
	C10 - C40 (Sum of total)	µg/L	100	<100	
	C6-C10	mg/l	0.02	<0.02	<0.02



Groundwater Monitoring Event – June 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Appendix A: Environmental Protection Licence 229-01



Groundwater Monitoring Event – June 2022

Global Resource Recovery

VOPAK TERMINAL, EAST ARM

Appendix B: Laboratory Certificates of Analysis



CHAIN OF CUSTODY RECORD

Eurofins | Environment Testing ABN 50 005 085 521



Sydney Laboratory
Unit F3 Bld F 16 Mars Road Lane Cove West NSW 2066
02 9900 8420 EnviroSampleNSW@eurofins.com



Brisbane Laboratory
Unit 1 21 Smithwood Place Marston QLD 4172
07 3902 4200 EnviroSampleQLD@eurofins.com



Perth Laboratory
Unit 2 91 Leach Highway Kewdale WA 6105
08 9251 9500 EnviroSampleWA@eurofins.com



Melbourne Laboratory
6 Montmorey Road Dandenong South VIC 3175
03 8564 5000 EnviroSampleVIC@eurofins.com

Company	Greencap NT P/L			Project No	J174436			Project Manager	Varun Bhagwat			Sampler(s)	VB							
Address	Unit 11 / 14 Winnellie Road Winnellie, NT 0820			Project Name	Groundwater Monitoring			EDD Format	ESdr ES015 etc			ESdat	Facility Code							
Contact Name	Varun Bhagwat			Analysis Where values are required, please specify 'Total' or 'Filtered' - NOTE: Total must be used to detect SURGE pricing.	B11C: Cation Suite	B11E: Anion Suite	B16A: Nutrient Suite	Ammonia	PCB	PFAS	Total Cyanide	BAA: TRHBTXNPAH/Phenols	BTXN	TRHBTXN	Handed over by	VB on 30/6/22				
Phone No	0428 829 444														Email for Invoice	Varun.Bhagwat@greencap.com.au				
Special Directions															Email for Results	Varun.Bhagwat@greencap.com.au				
Purchase Order	PO303966														Containers Change container type & size if necessary			Required Turnaround Time (TAT) Default will be 5 days if not boxed		
Quote ID No															500mL Plastic			*Surcharge will apply Overnight (reporting by 9am)* ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days ☒ 5 days (Standard) ☐ Other()		
No	Client Sample ID	Sampled Date/Time dd/mm/yyyy hh:mm	Matrix: Solid (S) Water (W)													Sample Comments / Dangerous Goods Hazard Warning				
1	EMB13	30/06/21	Water	X	X	X	X	X	X	X	X				1	2	2	2	1	
2	EMB14	30/06/21	Water	X	X	X	X	X	X	X	X				1	2	2	2	1	
3	QC01	30/06/21	Water								X						1	2		
4	RB01	30/06/21	Water										X				1	2		
5	TB01	30/06/21	Water									X						2		
Add Rows		Total Counts		2	2	2	2	2	2	2	3	1	1		2	4	6	10	2	
Method of Shipment:		☐ Courier (#) ☐ Hand Delivered		☐ Postal		Name		Signature		Date		Time		Temperature		Report No				
Laboratory Use Only		Received By		SYD BNE MEL PER ADL NTL DRW		Signature		Date		Time		Temperature		Report No						
Laboratory Use Only		Received By		SYD BNE MEL PER ADL NTL DRW		Signature		Date		Time		Temperature		Report No						

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

Melbourne 6 Monterey Road Dandenong South VIC 3175 Phone : +61 3 8564 5000 NATA # 1261 Site # 1254	Sydney 179 Magowar Road Girraween NSW 2145 Phone : +61 2 9900 8400 NATA # 1261 Site # 18217	Brisbane 1/21 Smallwood Place Murarrie QLD 4172 Phone : +61 7 3902 4600 NATA # 1261 Site # 20794	Newcastle 4/52 Industrial Drive Mayfield East NSW 2304 PO Box 60 Wickham 2293 Phone : +61 2 4968 8448 NATA # 1261 Site # 25079	Perth 46-48 Banksia Road Welshpool WA 6106 Phone : +61 8 6253 4444 NATA # 2377 Site # 2370	Auckland 35 O'Rourke Road Penrose, Auckland 1061 Phone : +64 9 526 45 51 IANZ # 1327	Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 Phone : 0800 856 450 IANZ # 1290

Eurofins ARL Pty Ltd

ABN: 91 05 0159 898

Eurofins Environment Testing NZ Limited

NZBN: 9429046024954

Sample Receipt Advice

Company name:	Greencap NT P/L
Contact name:	Varun
Project name:	Groundwater Monitoring
Project ID:	J174436
Turnaround time:	5 Day
Date/Time received	Jun 30, 2022 11:30 AM
Eurofins reference	901960

Sample Information

- ✓ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ✓ All samples have been received as described on the above COC.
- ✓ COC has been completed correctly.
- ✓ Attempt to chill was evident.
- ✓ Appropriately preserved sample containers have been used.
- ✓ All samples were received in good condition.
- ✗ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ✓ Appropriate sample containers have been used.
- ✓ Sample containers for volatile analysis received with zero headspace.
- ✗ Split sample sent to requested external lab.
- ✗ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Notes

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Michael Morrison on phone : 03 8564 5933 or by email: MichaelMorrison@eurofins.com

Results will be delivered electronically via email to Varun - varun.bhagwat@greencap.com.au.

Note: A copy of these results will also be delivered to the general Greencap NT P/L email address.

Greencap NT P/L
11/14 Winnellie Road
Winnellie
NT 0800



NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention: Varun

Report 901960-W
Project name Groundwater Monitoring
Project ID J174436
Received Date Jun 30, 2022

Client Sample ID			EMB13	EMB14	RB01	QC01
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			M22- Jn0067902	M22- Jn0067903	M22- Jn0067904	M22- Jn0067905
Date Sampled			Jun 30, 2022	Jun 30, 2022	Jun 30, 2022	Jun 30, 2022
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Naphthalene ^{N02}	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2) ^{N01}	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	101	94	99	106
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	-	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	-	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	-	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	-	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	-	< 0.001
Benzo(b&j)fluoranthene ^{N07}	0.001	mg/L	< 0.001	< 0.001	-	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001	< 0.001	-	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	-	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	-	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001	< 0.001	-	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	-	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	-	< 0.001
Indeno(1,2,3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	-	< 0.001

Client Sample ID			EMB13	EMB14	RB01	QC01
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			M22-Jn0067902	M22-Jn0067903	M22-Jn0067904	M22-Jn0067905
Date Sampled			Jun 30, 2022	Jun 30, 2022	Jun 30, 2022	Jun 30, 2022
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Naphthalene	0.001	mg/L	< 0.001	< 0.001	-	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	-	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	-	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	-	< 0.001
2-Fluorobiphenyl (surr.)	1	%	60	64	-	102
p-Terphenyl-d14 (surr.)	1	%	86	115	-	70
Polychlorinated Biphenyls						
Aroclor-1016	0.005	mg/L	< 0.005	< 0.005	-	-
Aroclor-1221	0.005	mg/L	< 0.005	< 0.005	-	-
Aroclor-1232	0.005	mg/L	< 0.005	< 0.005	-	-
Aroclor-1242	0.005	mg/L	< 0.005	< 0.005	-	-
Aroclor-1248	0.005	mg/L	< 0.005	< 0.005	-	-
Aroclor-1254	0.005	mg/L	< 0.005	< 0.005	-	-
Aroclor-1260	0.005	mg/L	< 0.005	< 0.005	-	-
Total PCB*	0.005	mg/L	< 0.005	< 0.005	-	-
Dibutylchloroendate (surr.)	1	%	108	121	-	-
Tetrachloro-m-xylene (surr.)	1	%	57	78	-	-
Phenols (Halogenated)						
2-Chlorophenol	0.003	mg/L	< 0.003	< 0.003	-	< 0.003
2,4-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	-	< 0.003
2,4,5-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	-	< 0.01
2,4,6-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	-	< 0.01
2,6-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	-	< 0.003
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01	< 0.01	-	< 0.01
Pentachlorophenol	0.01	mg/L	< 0.01	< 0.01	-	< 0.01
Tetrachlorophenols - Total	0.03	mg/L	< 0.03	< 0.03	-	< 0.03
Total Halogenated Phenol*	0.01	mg/L	< 0.01	< 0.01	-	< 0.01
Phenols (non-Halogenated)						
2-Cyclohexyl-4,6-dinitrophenol	0.1	mg/L	< 0.1	< 0.1	-	< 0.1
2-Methyl-4,6-dinitrophenol	0.03	mg/L	< 0.03	< 0.03	-	< 0.03
2-Nitrophenol	0.01	mg/L	< 0.01	< 0.01	-	< 0.01
2,4-Dimethylphenol	0.003	mg/L	< 0.003	< 0.003	-	< 0.003
2,4-Dinitrophenol	0.03	mg/L	< 0.03	< 0.03	-	< 0.03
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003	< 0.003	-	< 0.003
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006	< 0.006	-	< 0.006
Total cresols*	0.01	mg/L	< 0.01	< 0.01	-	< 0.01
4-Nitrophenol	0.03	mg/L	< 0.03	< 0.03	-	< 0.03
Dinoseb	0.1	mg/L	< 0.1	< 0.1	-	< 0.1
Phenol	0.003	mg/L	< 0.003	< 0.003	-	< 0.003
Phenol-d6 (surr.)	1	%	43	48	-	36
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1	< 0.1	-	< 0.1
Ammonia (as N)	0.01	mg/L	< 0.01	0.24	-	-
Chloride	1	mg/L	45	19	-	-
Cyanide (total)	0.005	mg/L	< 0.005	< 0.005	-	-
Nitrate & Nitrite (as N)	0.05	mg/L	4.7	6.3	-	-
Phosphate total (as P)	0.01	mg/L	< 0.01	< 0.01	-	-
Sulphate (as SO4)	5	mg/L	< 5	< 5	-	-

Client Sample ID			EMB13	EMB14	RB01	QC01
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			M22-Jn0067902	M22-Jn0067903	M22-Jn0067904	M22-Jn0067905
Date Sampled			Jun 30, 2022	Jun 30, 2022	Jun 30, 2022	Jun 30, 2022
Test/Reference	LOR	Unit				
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	4.0	6.2	-	-
Total Nitrogen (as N)*	0.2	mg/L	8.7	12.5	-	-
Alkalinity (speciated)						
Bicarbonate Alkalinity (as CaCO ₃)	20	mg/L	< 20	32	-	-
Carbonate Alkalinity (as CaCO ₃)	10	mg/L	< 10	< 10	-	-
Hydroxide Alkalinity (as CaCO ₃)	20	mg/L	< 20	< 20	-	-
Total Alkalinity (as CaCO ₃)	20	mg/L	< 20	32	-	-
Alkali Metals						
Calcium	0.5	mg/L	1.2	14	-	-
Magnesium	0.5	mg/L	0.6	1.4	-	-
Potassium	0.5	mg/L	2.2	3.1	-	-
Sodium	0.5	mg/L	20	6.7	-	-
Perfluoroalkyl carboxylic acids (PFCAs)						
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	2.6	0.23	-	-
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	14	0.77	-	-
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	13	0.49	-	-
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.01	ug/L	4.7	^{N09} 0.47	-	-
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	3.1	^{N09} 0.15	-	-
Perfluorononanoic acid (PFNA) ^{N11}	0.01	ug/L	0.39	0.15	-	-
Perfluorodecanoic acid (PFDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluoroundecanoic acid (PFUnDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorododecanoic acid (PFDoDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorotridecanoic acid (PFTeDA) ^{N15}	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	-	-
13C4-PFBA (surr.)	1	%	76	115	-	-
13C5-PFPeA (surr.)	1	%	84	138	-	-
13C5-PFHxA (surr.)	1	%	97	105	-	-
13C4-PFHpA (surr.)	1	%	88	116	-	-
13C8-PFOA (surr.)	1	%	84	145	-	-
13C5-PFNA (surr.)	1	%	87	86	-	-
13C6-PFDA (surr.)	1	%	140	111	-	-
13C2-PFUnDA (surr.)	1	%	177	119	-	-
13C2-PFDoDA (surr.)	1	%	157	128	-	-
13C2-PFTeDA (surr.)	1	%	23	69	-	-
Perfluoroalkyl sulfonamido substances						
Perfluorooctane sulfonamide (FOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	-	-
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	-	-
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	-	-
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE) ^{N11}	0.05	ug/L	< 0.05	< 0.05	-	-
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE) ^{N11}	0.05	ug/L	< 0.05	< 0.05	-	-
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	-	-
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	-	-
13C8-FOSA (surr.)	1	%	146	180	-	-
D3-N-MeFOSA (surr.)	1	%	75	67	-	-
D5-N-EtFOSA (surr.)	1	%	68	68	-	-

Client Sample ID Sample Matrix Eurofins Sample No. Date Sampled Test/Reference	LOR	Unit	EMB13 Water M22- Jn0067902 Jun 30, 2022	EMB14 Water M22- Jn0067903 Jun 30, 2022	RB01 Water M22- Jn0067904 Jun 30, 2022	QC01 Water M22- Jn0067905 Jun 30, 2022
Perfluoroalkyl sulfonamido substances						
D7-N-MeFOSE (surr.)	1	%	62	74	-	-
D9-N-EtFOSE (surr.)	1	%	98	78	-	-
D5-N-EtFOSAA (surr.)	1	%	137	137	-	-
D3-N-MeFOSAA (surr.)	1	%	164	126	-	-
Perfluoroalkyl sulfonic acids (PFSA's)						
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorononanesulfonic acid (PFNS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluoropropanesulfonic acid (PFPrS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	< 0.01	< 0.01	-	-
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	-	-
13C3-PFBS (surr.)	1	%	166	154	-	-
18O2-PFHxS (surr.)	1	%	192	178	-	-
13C8-PFOS (surr.)	1	%	83	80	-	-
n:2 Fluorotelomer sulfonic acids (n:2 FTSA's)						
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	0.01	ug/L	0.10	< 0.01	-	-
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA) ^{N11}	0.05	ug/L	110	0.11	-	-
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	0.01	ug/L	2.6	0.02	-	-
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	-	-
13C2-4:2 FTSA (surr.)	1	%	101	83	-	-
13C2-6:2 FTSA (surr.)	1	%	67	116	-	-
13C2-8:2 FTSA (surr.)	1	%	73	128	-	-
13C2-10:2 FTSA (surr.)	1	%	160	70	-	-
PFASs Summations						
Sum (PFHxS + PFOS)*	0.01	ug/L	< 0.01	< 0.01	-	-
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	3.1	0.15	-	-
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	3.1	0.15	-	-
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	150	2.24	-	-
Sum of PFASs (n=30)*	0.1	ug/L	150.49	2.39	-	-

Client Sample ID Sample Matrix Eurofins Sample No. Date Sampled Test/Reference	LOR	Unit	TB01 Water M22- Jn0067906 Jun 30, 2022
Total Recoverable Hydrocarbons			
Naphthalene ^{N02}	0.01	mg/L	< 0.01
BTEX			
Benzene	0.001	mg/L	< 0.001
Toluene	0.001	mg/L	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002

Client Sample ID			TB01
Sample Matrix			Water
Eurofins Sample No.			M22-Jn0067906
Date Sampled			Jun 30, 2022
Test/Reference	LOR	Unit	
BTEX			
o-Xylene	0.001	mg/L	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003
4-Bromofluorobenzene (surr.)	1	%	102

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B4A			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Jul 01, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Jul 01, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Jul 01, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	Jul 01, 2022	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
Polycyclic Aromatic Hydrocarbons	Melbourne	Jul 01, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (Halogenated)	Melbourne	Jul 01, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (non-Halogenated)	Melbourne	Jul 01, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Polychlorinated Biphenyls	Melbourne	Jul 01, 2022	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8082)			
Ammonia (as N)	Melbourne	Jul 01, 2022	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Cyanide (total)	Melbourne	Jul 01, 2022	14 Days
- Method: LTM-INO-4020 Total Free WAD Cyanide by CFA			
Eurofins Suite B11C: Na/K/Ca/Mg	Melbourne	Jul 01, 2022	180 Days
- Method: LTM-MET-3010 Alkali Metals by ICP-AES			
Eurofins Suite B11E: Cl/SO4/Alkalinity			
Chloride	Melbourne	Jul 01, 2022	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
Sulphate (as SO4)	Melbourne	Jul 01, 2022	28 Days
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
Alkalinity (speciated)	Melbourne	Jul 01, 2022	14 Days
- Method: LTM-INO-4250 Alkalinity by Electrometric Titration			
Total Nitrogen Set (as N)			
Nitrate & Nitrite (as N)	Melbourne	Jul 01, 2022	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Total Kjeldahl Nitrogen (as N)	Melbourne	Jul 01, 2022	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Eurofins Suite B19A: Total N (TKN, NOx), Total P			
Phosphate total (as P)	Melbourne	Jul 01, 2022	28 Days
- Method: LTM-INO-4040 Phosphate by CFA			
Per- and Polyfluoroalkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs)	Melbourne	Jul 01, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Melbourne	Jul 01, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFASs)	Melbourne	Jul 01, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Melbourne	Jul 01, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
PFASs Summations	Melbourne	Jun 30, 2022	
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

Company Name: Greencap NT P/L
Address: 11/14 Winnellie Road
Winnellie
NT 0800

Project Name: Groundwater Monitoring
Project ID: J174436

Order No.: PO303966
Report #: 901960
Phone: 61 8 8984 4244
Fax: 61 8 8984 3105

Received: Jun 30, 2022 11:30 AM
Due: Jul 7, 2022
Priority: 5 Day
Contact Name: Varun

Eurofins Analytical Services Manager : Michael Morrison

Sample Detail						Ammonia (as N)	Cyanide (total)	Polychlorinated Biphenyls	BTEX and Naphthalene	Total Recoverable Hydrocarbons	Eurofins Suite B4A	Eurofins Suite B19A: Total N (TKN, NOx), Total P	Eurofins Suite B11E: Cl/SO4/Alkalinity	Per- and Polyfluoroalkyl Substances (PFASs)	Eurofins Suite B11C: Na/K/Ca/Mg
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA # 1261 Site # 18217															
Brisbane Laboratory - NATA # 1261 Site # 20794															
Mayfield Laboratory - NATA # 1261 Site # 25079															
Perth Laboratory - NATA # 2377 Site # 2370															
External Laboratory															
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID										
1	EMB13	Jun 30, 2022		Water	M22-Jn0067902	X	X	X			X	X	X	X	X
2	EMB14	Jun 30, 2022		Water	M22-Jn0067903	X	X	X			X	X	X	X	X
3	RB01	Jun 30, 2022		Water	M22-Jn0067904				X	X					
4	QC01	Jun 30, 2022		Water	M22-Jn0067905						X				
5	TB01	Jun 30, 2022		Water	M22-Jn0067906				X						
Test Counts						2	2	2	2	1	3	2	2	2	2

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	µg/L: micrograms per litre
ppm: parts per million	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
Naphthalene	mg/L	< 0.01			0.01	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total*	mg/L	< 0.003			0.003	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/L	< 0.001			0.001	Pass	
Acenaphthylene	mg/L	< 0.001			0.001	Pass	
Anthracene	mg/L	< 0.001			0.001	Pass	
Benz(a)anthracene	mg/L	< 0.001			0.001	Pass	
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.001			0.001	Pass	
Benzo(g,h,i)perylene	mg/L	< 0.001			0.001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.001			0.001	Pass	
Chrysene	mg/L	< 0.001			0.001	Pass	
Dibenz(a,h)anthracene	mg/L	< 0.001			0.001	Pass	
Fluoranthene	mg/L	< 0.001			0.001	Pass	
Fluorene	mg/L	< 0.001			0.001	Pass	
Indeno(1,2,3-cd)pyrene	mg/L	< 0.001			0.001	Pass	
Naphthalene	mg/L	< 0.001			0.001	Pass	
Phenanthrene	mg/L	< 0.001			0.001	Pass	
Pyrene	mg/L	< 0.001			0.001	Pass	
Method Blank							
Polychlorinated Biphenyls							
Aroclor-1016	mg/L	< 0.005			0.005	Pass	
Aroclor-1221	mg/L	< 0.005			0.005	Pass	
Aroclor-1232	mg/L	< 0.005			0.005	Pass	
Aroclor-1242	mg/L	< 0.005			0.005	Pass	
Aroclor-1248	mg/L	< 0.005			0.005	Pass	
Aroclor-1254	mg/L	< 0.005			0.005	Pass	
Aroclor-1260	mg/L	< 0.005			0.005	Pass	
Total PCB*	mg/L	< 0.005			0.005	Pass	
Method Blank							
Phenols (Halogenated)							
2-Chlorophenol	mg/L	< 0.003			0.003	Pass	
2,4-Dichlorophenol	mg/L	< 0.003			0.003	Pass	
2,4,5-Trichlorophenol	mg/L	< 0.01			0.01	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
2,4,6-Trichlorophenol	mg/L	< 0.01			0.01	Pass	
2,6-Dichlorophenol	mg/L	< 0.003			0.003	Pass	
4-Chloro-3-methylphenol	mg/L	< 0.01			0.01	Pass	
Pentachlorophenol	mg/L	< 0.01			0.01	Pass	
Tetrachlorophenols - Total	mg/L	< 0.03			0.03	Pass	
Method Blank							
Phenols (non-Halogenated)							
2-Cyclohexyl-4,6-dinitrophenol	mg/L	< 0.1			0.1	Pass	
2-Methyl-4,6-dinitrophenol	mg/L	< 0.03			0.03	Pass	
2-Nitrophenol	mg/L	< 0.01			0.01	Pass	
2,4-Dimethylphenol	mg/L	< 0.003			0.003	Pass	
2,4-Dinitrophenol	mg/L	< 0.03			0.03	Pass	
2-Methylphenol (o-Cresol)	mg/L	< 0.003			0.003	Pass	
3&4-Methylphenol (m&p-Cresol)	mg/L	< 0.006			0.006	Pass	
4-Nitrophenol	mg/L	< 0.03			0.03	Pass	
Dinoseb	mg/L	< 0.1			0.1	Pass	
Phenol	mg/L	< 0.003			0.003	Pass	
Method Blank							
Ammonia (as N)	mg/L	< 0.01			0.01	Pass	
Chloride	mg/L	< 1			1	Pass	
Cyanide (total)	mg/L	< 0.005			0.005	Pass	
Nitrate & Nitrite (as N)	mg/L	< 0.05			0.05	Pass	
Phosphate total (as P)	mg/L	< 0.01			0.01	Pass	
Sulphate (as SO ₄)	mg/L	< 5			5	Pass	
Total Kjeldahl Nitrogen (as N)	mg/L	< 0.2			0.2	Pass	
Method Blank							
Alkalinity (speciated)							
Bicarbonate Alkalinity (as CaCO ₃)	mg/L	< 20			20	Pass	
Carbonate Alkalinity (as CaCO ₃)	mg/L	< 10			10	Pass	
Hydroxide Alkalinity (as CaCO ₃)	mg/L	< 20			20	Pass	
Total Alkalinity (as CaCO ₃)	mg/L	< 20			20	Pass	
Method Blank							
Alkali Metals							
Calcium	mg/L	< 0.5			0.5	Pass	
Magnesium	mg/L	< 0.5			0.5	Pass	
Potassium	mg/L	< 0.5			0.5	Pass	
Sodium	mg/L	< 0.5			0.5	Pass	
Method Blank							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	ug/L	< 0.05			0.05	Pass	
Perfluoropentanoic acid (PFPeA)	ug/L	< 0.01			0.01	Pass	
Perfluorohexanoic acid (PFHxA)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanoic acid (PFHpA)	ug/L	< 0.01			0.01	Pass	
Perfluorooctanoic acid (PFOA)	ug/L	< 0.01			0.01	Pass	
Perfluorononanoic acid (PFNA)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanoic acid (PFDA)	ug/L	< 0.01			0.01	Pass	
Perfluoroundecanoic acid (PFUnDA)	ug/L	< 0.01			0.01	Pass	
Perfluorododecanoic acid (PFDoDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotridecanoic acid (PFTeDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotetradecanoic acid (PFTeDA)	ug/L	< 0.01			0.01	Pass	
Method Blank							
Perfluoroalkyl sulfonamido substances							
Perfluorooctane sulfonamide (FOSA)	ug/L	< 0.05			0.05	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	ug/L	< 0.05			0.05	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	ug/L	< 0.05			0.05	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	ug/L	< 0.05			0.05	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	ug/L	< 0.05			0.05	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	ug/L	< 0.05			0.05	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	ug/L	< 0.05			0.05	Pass	
Method Blank							
Perfluoroalkyl sulfonic acids (PFSA's)							
Perfluorobutanesulfonic acid (PFBS)	ug/L	< 0.01			0.01	Pass	
Perfluorononanesulfonic acid (PFNS)	ug/L	< 0.01			0.01	Pass	
Perfluoropropanesulfonic acid (PFPrS)	ug/L	< 0.01			0.01	Pass	
Perfluoropentanesulfonic acid (PFPeS)	ug/L	< 0.01			0.01	Pass	
Perfluorohexanesulfonic acid (PFHxS)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	ug/L	< 0.01			0.01	Pass	
Perfluorooctanesulfonic acid (PFOS)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanesulfonic acid (PFDS)	ug/L	< 0.01			0.01	Pass	
Method Blank							
n:2 Fluorotelomer sulfonic acids (n:2 FTSA's)							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	ug/L	< 0.05			0.05	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	ug/L	< 0.01			0.01	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons							
TRH C6-C9	%	95			70-130	Pass	
TRH C10-C14	%	127			70-130	Pass	
Naphthalene	%	97			70-130	Pass	
TRH C6-C10	%	93			70-130	Pass	
TRH >C10-C16	%	124			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	93			70-130	Pass	
Toluene	%	98			70-130	Pass	
Ethylbenzene	%	100			70-130	Pass	
m&p-Xylenes	%	98			70-130	Pass	
Xylenes - Total*	%	99			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	99			70-130	Pass	
Acenaphthylene	%	90			70-130	Pass	
Anthracene	%	71			70-130	Pass	
Benz(a)anthracene	%	94			70-130	Pass	
Benzo(a)pyrene	%	101			70-130	Pass	
Benzo(b&j)fluoranthene	%	88			70-130	Pass	
Benzo(g,h,i)perylene	%	80			70-130	Pass	
Benzo(k)fluoranthene	%	124			70-130	Pass	
Chrysene	%	92			70-130	Pass	
Dibenz(a,h)anthracene	%	84			70-130	Pass	
Fluoranthene	%	79			70-130	Pass	
Fluorene	%	76			70-130	Pass	
Indeno(1,2,3-cd)pyrene	%	92			70-130	Pass	
Naphthalene	%	101			70-130	Pass	
Phenanthrene	%	119			70-130	Pass	
Pyrene	%	77			70-130	Pass	
LCS - % Recovery							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Polychlorinated Biphenyls							
Aroclor-1260	%	104			70-130	Pass	
LCS - % Recovery							
Phenols (Halogenated)							
2-Chlorophenol	%	80			25-140	Pass	
2,4-Dichlorophenol	%	58			25-140	Pass	
2,4,5-Trichlorophenol	%	58			25-140	Pass	
2,4,6-Trichlorophenol	%	94			25-140	Pass	
2,6-Dichlorophenol	%	59			25-140	Pass	
4-Chloro-3-methylphenol	%	83			25-140	Pass	
Pentachlorophenol	%	36			25-140	Pass	
Tetrachlorophenols - Total	%	68			25-140	Pass	
LCS - % Recovery							
Phenols (non-Halogenated)							
2-Cyclohexyl-4,6-dinitrophenol	%	43			25-140	Pass	
2-Methyl-4,6-dinitrophenol	%	55			25-140	Pass	
2-Nitrophenol	%	77			25-140	Pass	
2,4-Dimethylphenol	%	80			25-140	Pass	
2,4-Dinitrophenol	%	55			25-140	Pass	
2-Methylphenol (o-Cresol)	%	83			25-140	Pass	
3&4-Methylphenol (m&p-Cresol)	%	60			25-140	Pass	
4-Nitrophenol	%	72			25-140	Pass	
Dinoseb	%	62			25-140	Pass	
Phenol	%	50			25-140	Pass	
LCS - % Recovery							
Ammonia (as N)	%	97			70-130	Pass	
Chloride	%	107			70-130	Pass	
Nitrate & Nitrite (as N)	%	84			70-130	Pass	
Phosphate total (as P)	%	111			70-130	Pass	
Sulphate (as SO4)	%	96			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	%	116			70-130	Pass	
LCS - % Recovery							
Alkalinity (speciated)							
Carbonate Alkalinity (as CaCO3)	%	82			70-130	Pass	
Total Alkalinity (as CaCO3)	%	89			70-130	Pass	
LCS - % Recovery							
Alkali Metals							
Calcium	%	108			80-120	Pass	
Magnesium	%	106			80-120	Pass	
Potassium	%	102			80-120	Pass	
Sodium	%	104			80-120	Pass	
LCS - % Recovery							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	%	90			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	91			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	83			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	84			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	83			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	89			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	111			50-150	Pass	
Perfluorotridecanoic acid (PFTTrDA)	%	140			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	110			50-150	Pass	
LCS - % Recovery							
Perfluoroalkyl sulfonamido substances							

Test				Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Perfluorooctane sulfonamide (FOSA)				%	99			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)				%	128			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)				%	107			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)				%	136			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)				%	117			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)				%	115			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)				%	142			50-150	Pass	
LCS - % Recovery										
Perfluoroalkyl sulfonic acids (PFSA's)										
Perfluorobutanesulfonic acid (PFBS)				%	131			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)				%	107			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)				%	137			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)				%	117			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)				%	138			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)				%	124			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)				%	133			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)				%	103			50-150	Pass	
LCS - % Recovery										
n:2 Fluorotelomer sulfonic acids (n:2 FTSA's)										
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)				%	118			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)				%	109			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)				%	90			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)				%	113			50-150	Pass	
Test	Lab Sample ID	QA Source		Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery										
Total Recoverable Hydrocarbons					Result 1					
TRH C6-C9	M22-JI0003240	NCP		%	95			70-130	Pass	
TRH C10-C14	M22-Jn0069239	NCP		%	93			70-130	Pass	
Naphthalene	M22-JI0003240	NCP		%	92			70-130	Pass	
TRH C6-C10	M22-JI0003240	NCP		%	92			70-130	Pass	
TRH >C10-C16	M22-Jn0069239	NCP		%	98			70-130	Pass	
Spike - % Recovery										
BTEX					Result 1					
Benzene	M22-JI0003240	NCP		%	74			70-130	Pass	
Toluene	M22-JI0003240	NCP		%	100			70-130	Pass	
Ethylbenzene	M22-JI0003240	NCP		%	100			70-130	Pass	
m&p-Xylenes	M22-JI0003240	NCP		%	100			70-130	Pass	
o-Xylene	M22-JI0003240	NCP		%	102			70-130	Pass	
Xylenes - Total*	M22-JI0003240	NCP		%	101			70-130	Pass	
Spike - % Recovery										
Polycyclic Aromatic Hydrocarbons					Result 1					
Acenaphthene	B22-JI0002348	NCP		%	113			70-130	Pass	
Acenaphthylene	B22-JI0002348	NCP		%	116			70-130	Pass	
Anthracene	B22-JI0002348	NCP		%	95			70-130	Pass	
Benz(a)anthracene	B22-JI0002348	NCP		%	108			70-130	Pass	
Benzo(a)pyrene	B22-JI0002348	NCP		%	91			70-130	Pass	
Benzo(b&j)fluoranthene	B22-JI0002348	NCP		%	83			70-130	Pass	
Benzo(g,h,i)perylene	B22-JI0002348	NCP		%	106			70-130	Pass	
Benzo(k)fluoranthene	B22-JI0002348	NCP		%	114			70-130	Pass	
Chrysene	B22-JI0002348	NCP		%	88			70-130	Pass	
Dibenz(a,h)anthracene	B22-JI0002348	NCP		%	88			70-130	Pass	
Fluoranthene	B22-JI0002348	NCP		%	115			70-130	Pass	
Fluorene	B22-JI0002348	NCP		%	111			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Indeno(1.2.3-cd)pyrene	B22-JI0002348	NCP	%	117			70-130	Pass	
Naphthalene	B22-JI0002348	NCP	%	94			70-130	Pass	
Phenanthrene	B22-JI0002348	NCP	%	85			70-130	Pass	
Pyrene	B22-JI0002348	NCP	%	102			70-130	Pass	
Spike - % Recovery									
Phenols (Halogenated)				Result 1					
2-Chlorophenol	B22-JI0002348	NCP	%	115			30-130	Pass	
2.4-Dichlorophenol	B22-JI0002348	NCP	%	53			30-130	Pass	
2.4.5-Trichlorophenol	B22-JI0002348	NCP	%	102			30-130	Pass	
2.4.6-Trichlorophenol	B22-JI0002348	NCP	%	65			30-130	Pass	
2.6-Dichlorophenol	B22-JI0002348	NCP	%	82			30-130	Pass	
4-Chloro-3-methylphenol	B22-JI0002348	NCP	%	44			30-130	Pass	
Pentachlorophenol	B22-JI0002348	NCP	%	36			30-130	Pass	
Tetrachlorophenols - Total	B22-JI0002348	NCP	%	121			30-130	Pass	
Spike - % Recovery									
Phenols (non-Halogenated)				Result 1					
2-Cyclohexyl-4.6-dinitrophenol	B22-JI0002348	NCP	%	58			30-130	Pass	
2-Methyl-4.6-dinitrophenol	B22-JI0002348	NCP	%	51			30-130	Pass	
2-Nitrophenol	B22-JI0002348	NCP	%	99			30-130	Pass	
2.4-Dimethylphenol	B22-JI0002348	NCP	%	59			30-130	Pass	
Dinoseb	B22-JI0002348	NCP	%	56			30-130	Pass	
Phenol	B22-JI0002348	NCP	%	125			30-130	Pass	
Spike - % Recovery									
				Result 1					
Phosphate total (as P)	M22-Jn0069879	NCP	%	108			70-130	Pass	
Spike - % Recovery									
Alkali Metals				Result 1					
Calcium	M22-JI0006850	NCP	%	96			75-125	Pass	
Magnesium	M22-JI0006850	NCP	%	90			75-125	Pass	
Potassium	M22-JI0006850	NCP	%	93			75-125	Pass	
Sodium	M22-JI0002831	NCP	%	110			75-125	Pass	
Spike - % Recovery									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1					
Perfluorobutanoic acid (PFBA)	M22-Jn0067902	CP	%	n/a			50-150	Fail	
Perfluoropentanoic acid (PFPeA)	M22-Jn0067902	CP	%	n/a			50-150	Fail	
Perfluorohexanoic acid (PFHxA)	M22-Jn0067902	CP	%	n/a			50-150	Fail	
Perfluoroheptanoic acid (PFHpA)	M22-Jn0067902	CP	%	n/a			50-150	Fail	
Perfluorooctanoic acid (PFOA)	M22-Jn0067902	CP	%	n/a			50-150	Fail	
Perfluorononanoic acid (PFNA)	M22-Jn0067902	CP	%	n/a			50-150	Fail	
Perfluorodecanoic acid (PFDA)	M22-Jn0067902	CP	%	130			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	M22-Jn0067902	CP	%	137			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	M22-Jn0067902	CP	%	128			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	M22-Jn0067902	CP	%	126			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M22-Jn0067902	CP	%	135			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances				Result 1					
Perfluorooctane sulfonamide (FOSA)	M22-Jn0067902	CP	%	149			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M22-Jn0067902	CP	%	135			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M22-Jn0067902	CP	%	134			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	M22-Jn0067902	CP	%	136			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	M22-Jn0067902	CP	%	135			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M22-Jn0067902	CP	%	132			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M22-Jn0067902	CP	%	116			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFSA's)				Result 1					
Perfluorobutanesulfonic acid (PFBS)	M22-Jn0067902	CP	%	124			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	M22-Jn0067902	CP	%	117			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M22-Jn0067902	CP	%	83			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M22-Jn0067902	CP	%	76			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M22-Jn0067902	CP	%	132			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M22-Jn0067902	CP	%	106			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	M22-Jn0067902	CP	%	86			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	M22-Jn0067902	CP	%	149			50-150	Pass	
Spike - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA's)				Result 1					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M22-Jn0067902	CP	%	139			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M22-Jn0067902	CP	%	n/a			50-150	Fail	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M22-Jn0067902	CP	%	n/a			50-150	Fail	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M22-Jn0067902	CP	%	136			50-150	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C6-C9	M22-JI0003239	NCP	mg/L	0.02	0.03	1.7	30%	Pass	
TRH C10-C14	M22-JI0003011	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	M22-JI0003011	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	M22-JI0003011	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Naphthalene	M22-JI0003239	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
TRH C6-C10	M22-JI0003239	NCP	mg/L	0.02	0.03	1.7	30%	Pass	
TRH >C10-C16	M22-JI0003011	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH >C16-C34	M22-JI0003011	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C34-C40	M22-JI0003011	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	M22-JI0003239	NCP	mg/L	0.012	0.013	7.1	30%	Pass	
Toluene	M22-JI0003239	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Ethylbenzene	M22-JI0003239	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
m&p-Xylenes	M22-JI0003239	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
o-Xylene	M22-JI0003239	NCP	mg/L	0.002	0.002	4.7	30%	Pass	
Xylenes - Total*	M22-JI0003239	NCP	mg/L	0.003	0.003	4.3	30%	Pass	

Duplicate								
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD		
Acenaphthene	B22-JI0002347	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Acenaphthylene	B22-JI0002347	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Anthracene	B22-JI0002347	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benz(a)anthracene	B22-JI0002347	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benzo(a)pyrene	B22-JI0002347	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benzo(b&j)fluoranthene	B22-JI0002347	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benzo(g,h,i)perylene	B22-JI0002347	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benzo(k)fluoranthene	B22-JI0002347	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Chrysene	B22-JI0002347	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Dibenz(a,h)anthracene	B22-JI0002347	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Fluoranthene	B22-JI0002347	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Fluorene	B22-JI0002347	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Indeno(1,2,3-cd)pyrene	B22-JI0002347	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Naphthalene	B22-JI0002347	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Phenanthrene	B22-JI0002347	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Pyrene	B22-JI0002347	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Duplicate								
Polychlorinated Biphenyls				Result 1	Result 2	RPD		
Aroclor-1016	M22-Jn0067919	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Aroclor-1221	M22-Jn0067919	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Aroclor-1232	M22-Jn0067919	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Aroclor-1242	M22-Jn0067919	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Aroclor-1248	M22-Jn0067919	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Aroclor-1254	M22-Jn0067919	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Aroclor-1260	M22-Jn0067919	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Total PCB*	M22-Jn0067919	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Duplicate								
Phenols (Halogenated)				Result 1	Result 2	RPD		
2-Chlorophenol	B22-JI0002347	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass
2,4-Dichlorophenol	B22-JI0002347	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass
2,4,5-Trichlorophenol	B22-JI0002347	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass
2,4,6-Trichlorophenol	B22-JI0002347	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass
4-Chloro-3-methylphenol	B22-JI0002347	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass
Pentachlorophenol	B22-JI0002347	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass
Tetrachlorophenols - Total	B22-JI0002347	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass
Duplicate								
Phenols (non-Halogenated)				Result 1	Result 2	RPD		
2-Cyclohexyl-4,6-dinitrophenol	B22-JI0002347	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass
2-Methyl-4,6-dinitrophenol	B22-JI0002347	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass
2-Nitrophenol	B22-JI0002347	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass
2,4-Dimethylphenol	B22-JI0002347	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass
2,4-Dinitrophenol	B22-JI0002347	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass
2-Methylphenol (o-Cresol)	B22-JI0002347	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass
3&4-Methylphenol (m&p-Cresol)	B22-JI0002347	NCP	mg/L	< 0.006	< 0.006	<1	30%	Pass
4-Nitrophenol	B22-JI0002347	NCP	mg/L	< 0.03	< 0.03	<1	30%	Pass
Dinoseb	B22-JI0002347	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass
Phenol	B22-JI0002347	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Ammonia (as N)	M22-Jn0068962	NCP	mg/L	65	66	2.4	30%	Pass
Chloride	M22-Jn0069644	NCP	mg/L	3400	3400	<1	30%	Pass
Cyanide (total)	M22-JI0001995	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Nitrate & Nitrite (as N)	M22-Jn0068962	NCP	mg/L	13	13	1.6	30%	Pass
Phosphate total (as P)	M22-Jn0068590	NCP	mg/L	0.05	0.05	2.7	30%	Pass

Duplicate								
				Result 1	Result 2	RPD		
Sulphate (as SO ₄)	M22-Jn0069644	NCP	mg/L	110	110	<1	30%	Pass
Total Kjeldahl Nitrogen (as N)	M22-Jn0067902	CP	mg/L	4.0	4.4	10	30%	Pass
Duplicate								
Alkalinity (speciated)				Result 1	Result 2	RPD		
Bicarbonate Alkalinity (as CaCO ₃)	M22-JI0005363	NCP	mg/L	71	64	11	30%	Pass
Carbonate Alkalinity (as CaCO ₃)	M22-JI0005363	NCP	mg/L	< 10	< 10	<1	30%	Pass
Hydroxide Alkalinity (as CaCO ₃)	M22-JI0005363	NCP	mg/L	< 20	< 20	<1	30%	Pass
Total Alkalinity (as CaCO ₃)	M22-JI0005363	NCP	mg/L	71	64	11	30%	Pass
Duplicate								
Alkali Metals				Result 1	Result 2	RPD		
Magnesium	M22-JI0001887	NCP	mg/L	20	25	20	30%	Pass
Potassium	M22-JI0001887	NCP	mg/L	15	15	<1	30%	Pass
Sodium	M22-JI0001995	NCP	mg/L	210	210	5.8	30%	Pass
Duplicate								
Alkali Metals				Result 1	Result 2	RPD		
Calcium	M22-JI0001995	NCP	mg/L	84	95	9.0	30%	Pass
Duplicate								
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1	Result 2	RPD		
Perfluorobutanoic acid (PFBA)	M22-Jn0067903	CP	ug/L	0.23	0.23	2.3	30%	Pass
Perfluoropentanoic acid (PFPeA)	M22-Jn0067903	CP	ug/L	0.77	0.74	3.5	30%	Pass
Perfluorohexanoic acid (PFHxA)	M22-Jn0067903	CP	ug/L	0.49	0.47	3.3	30%	Pass
Perfluoroheptanoic acid (PFHpA)	M22-Jn0067903	CP	ug/L	0.47	0.45	4.9	30%	Pass
Perfluorooctanoic acid (PFOA)	M22-Jn0067903	CP	ug/L	0.15	0.14	5.4	30%	Pass
Perfluorononanoic acid (PFNA)	M22-Jn0067903	CP	ug/L	0.15	0.14	4.4	30%	Pass
Perfluorodecanoic acid (PFDA)	M22-Jn0067903	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoroundecanoic acid (PFUnDA)	M22-Jn0067903	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorododecanoic acid (PFDoDA)	M22-Jn0067903	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorotridecanoic acid (PFTrDA)	M22-Jn0067903	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorotetradecanoic acid (PFTeDA)	M22-Jn0067903	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Duplicate								
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD		
Perfluorooctane sulfonamide (FOSA)	M22-Jn0067903	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M22-Jn0067903	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M22-Jn0067903	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	M22-Jn0067903	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	M22-Jn0067903	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M22-Jn0067903	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M22-Jn0067903	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass

Duplicate								
Perfluoroalkyl sulfonic acids (PFASs)				Result 1	Result 2	RPD		
Perfluorobutanesulfonic acid (PFBS)	M22-Jn0067903	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorononanesulfonic acid (PFNS)	M22-Jn0067903	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropropanesulfonic acid (PFPrS)	M22-Jn0067903	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropentanesulfonic acid (PFPeS)	M22-Jn0067903	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorohexanesulfonic acid (PFHxS)	M22-Jn0067903	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoroheptanesulfonic acid (PFHpS)	M22-Jn0067903	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorooctanesulfonic acid (PFOS)	M22-Jn0067903	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorodecanesulfonic acid (PFDS)	M22-Jn0067903	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Duplicate								
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)				Result 1	Result 2	RPD		
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M22-Jn0067903	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	M22-Jn0067903	CP	ug/L	0.11	0.10	6.9	30%	Pass
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M22-Jn0067903	CP	ug/L	0.02	0.02	12	30%	Pass
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M22-Jn0067903	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
N09	Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).

Authorised by:

Michael Morrison	Analytical Services Manager
Caitlin Breeze	Senior Analyst-Inorganic
Edward Lee	Senior Analyst-Organic
Joseph Edouard	Senior Analyst-PFAS
Mary Makarios	Senior Analyst-Inorganic
Mary Makarios	Senior Analyst-Metal
Scott Beddoes	Senior Analyst-Inorganic
Scott Beddoes	Senior Analyst-Metal
Vivian Wang	Senior Analyst-Volatile



Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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Client	:	GRR	Date	:	30/06/2022
Project	:	Groundwater Monitoring	Sampled by	:	Varun Bhagwat
Project Manager	:	Varun Bhagwat	Sampler Mobile	:	0428 829 444
Job No.	:	J174436	Purchase Order	:	PO303979
Location	:	800 Berrimah Rd, East Arm	T/Around	:	***STANDARD TAT***

Please email results to: Varun.Bhagwat@greencap.com.au

Relinquished by: VB on 30/6/22	Relieved by:	Relinquished by:	Received by:
Signature & date	Signature & date	Signature & date	Signature & date

Field ID	Depth	Sampled	Matrix (Soil, Water, Vapour, etc)	Sample Containers								Testing										
				40ml Vials (HCL preserved)	40ml Vials (for Glycols)	100ml Glass Amber (semi-volatile)	60ml Plastic	60ml Plastic Nutrients (N ₂ SO ₄)	250ml Plastic (unpreserved)	60ml Ferrous Iron (HCL)	60ml Plastic - Cyanide/Hex Cr (NaOH)	250ml Plastic (PFOS/PFOA)	S-4: TRH, BTEXN	W3: NEPM Suite: 15 Metals	Glycols (7 analytes)	W24: TRH/BTEXN/PAH/Phenols	P-15/2 SA EPA Waste Screen	Antimony (Sb)	S-12: OCP, OPP	S-18: TRH (C6-C10) & BTEX	BTEXN	P-22: NEPM Screen for Soil Classification Screen
		Date																				
1	EMB13	17/12/2021	W		2		1								X	X		X				
1	EMB14	17/12/2021	W		2		1								X	X		X				
3	QC01A	17/12/2021	W	2		1											X					
Totals					2	4	1	2	0	0	0	0	0	0	2	2	1	0	2	0	0	0

Environmental Division
Sydney
Work Order Reference
ES2222495



Telephone . + 61-2-8784 8555

LAB OF ORIGIN:
DARWIN

Kim - ALS
01-07-22
8:00 am

4 x Green Vials sent to Melbourne lab.

**SAMPLE RECEIPT NOTIFICATION (SRN)****Work Order : ES2222495**

Client	: GRENCAP-NAA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: VARUN BHAGWAT	Contact	: Shane Ellis
Address	: 11/14 Winnellie Road WINNELLIE NT, AUSTRALIA 0820	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: varun.bhagwat@greencap.com.au	E-mail	: Shane.Ellis@ALSGlobal.com
Telephone	: ----	Telephone	: +61 2 8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: J174436 Groundwater Monitoring	Page	: 1 of 2
Order number	: 303979	Quote number	: ES2020ADEENV0001 (EN/222)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: 800 Berrimah Rd. East Arm		
Sampler	: VARUN BHAGWAT		

Dates

Date Samples Received	: 01-Jul-2022 08:00	Issue Date	: 01-Jul-2022
Client Requested Due Date	: 08-Jul-2022	Scheduled Reporting Date	: 08-Jul-2022

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 25.9°C
Receipt Detail	:	No. of samples received / analysed	: 3 / 3

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- **Glycols analysis will be conducted by ALS Melbourne.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- ### Summary of Sample(s) and Requested Analysis

Matrix: WATER

Laboratory sample ID	Sampling date / time	Sample ID	WATER Dissolve	WATER Glycols	WATER 15 Meta	WATER TRH/BT
ES2222495-001	30-Jun-2022 00:00	EMB13	✓	✓	✓	
ES2222495-002	30-Jun-2022 00:00	EMB14	✓	✓	✓	
ES2222495-003	30-Jun-2022 00:00	QC01A				✓

[illegible]

QUALITY CONTROL REPORT

Work Order	: ES2222495	Page	: 1 of 7
Client	: GRENCAP-NAA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: VARUN BHAGWAT	Contact	: Shane Ellis
Address	: 11/14 Winnellie Road WINNELLIE NT, AUSTRALIA 0820	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61 2 8784 8555
Project	: J174436 Groundwater Monitoring	Date Samples Received	: 01-Jul-2022
Order number	: 303979	Date Analysis Commenced	: 01-Jul-2022
C-O-C number	: ----	Issue Date	: 08-Jul-2022
Sampler	: VARUN BHAGWAT		
Site	: 800 Berrimah Rd. East Arm		
Quote number	: EN/222		
No. of samples received	: 3		
No. of samples analysed	: 3		



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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

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	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Xing Lin	Senior Organic Chemist	Melbourne Organics, Springvale, VIC



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.

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 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
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 4441526)									
ES2222918-005	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.263	0.262	0.5	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.017	0.017	0.0	0% - 50%
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.056	0.054	4.0	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.063	0.058	8.4	0% - 50%
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	0.06	0.06	0.0	No Limit
ES2222917-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.090	0.089	0.0	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.018	0.016	11.2	0% - 50%
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 4441526) - continued									
ES2222917-001	Anonymous	EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.073	0.075	2.4	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.024	0.024	0.0	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 4441527)									
ES2222495-002	EMB14	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2223061-050	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EP067: Glycols (QC Lot: 4443174)									
ES2222495-002	EMB14	EP067: 2-Ethoxyethyl acetate	111-15-9	2	mg/L	<2	<2	0.0	No Limit
		EP067: 2-Butoxyethanol	111-76-2	2	mg/L	<2	<2	0.0	No Limit
		EP067: Propylene glycol	57-55-6	2	mg/L	<2	<2	0.0	No Limit
		EP067: Ethylene glycol	107-21-1	2	mg/L	<2	<2	0.0	No Limit
		EP067: Diethylene glycol monobutyl ether	112-34-5	2	mg/L	<2	<2	0.0	No Limit
		EP067: Diethylene glycol	111-46-6	2	mg/L	<2	<2	0.0	No Limit
		EP067: Triethylene glycol	112-27-6	2	mg/L	<2	<2	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4442886)									
ES2222495-003	QC01A	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES2223061-055	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4442886)									
ES2222495-003	QC01A	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES2223061-055	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 4442886)									
ES2222495-003	QC01A	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.0	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
ES2223061-055	Anonymous	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.0	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit		



Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
Method: Compound	CAS Number	LOR	Unit		Result	Spike	Spike Recovery (%)	Acceptable Limits (%)
				Concentration		LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 4441526)								
EG020A-F: Antimony	7440-36-0	0.001	mg/L	<0.001	0.02 mg/L	96.2	70.0	130
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	95.5	85.0	114
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	95.6	85.0	115
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	96.7	82.0	110
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	93.8	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	94.5	85.0	111
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	95.0	82.0	112
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	93.7	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	93.7	83.0	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	92.5	82.0	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	94.9	82.0	112
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	92.4	85.0	115
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	95.2	83.0	109
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	99.9	81.0	117
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.5 mg/L	94.2	85.0	115
EG035F: Dissolved Mercury by FIMS (QCLot: 4441527)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	90.9	83.0	105
EP067: Glycols (QCLot: 4443174)								
EP067: 2-Ethoxyethyl acetate	111-15-9	2	mg/L	<2	100 mg/L	131	60.3	134
EP067: 2-Butoxyethanol	111-76-2	2	mg/L	<2	100 mg/L	127	61.6	140
EP067: Propylene glycol	57-55-6	2	mg/L	<2	100 mg/L	127	77.9	132
EP067: Ethylene glycol	107-21-1	2	mg/L	<2	100 mg/L	126	74.7	136
EP067: Diethylene glycol monobutyl ether	112-34-5	2	mg/L	<2	100 mg/L	125	73.4	136
EP067: Diethylene glycol	111-46-6	2	mg/L	<2	100 mg/L	128	74.4	138
EP067: Triethylene glycol	112-27-6	2	mg/L	<2	100 mg/L	134	69.0	142
EP075(SIM)A: Phenolic Compounds (QCLot: 4434230)								
EP075(SIM): Phenol	108-95-2	1	µg/L	<1.0	5 µg/L	40.4	24.5	61.9
EP075(SIM): 2-Chlorophenol	95-57-8	1	µg/L	<1.0	5 µg/L	75.8	52.0	90.0
EP075(SIM): 2-Methylphenol	95-48-7	1	µg/L	<1.0	5 µg/L	78.1	51.0	91.0
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	2	µg/L	<2.0	10 µg/L	63.8	44.0	88.0
EP075(SIM): 2-Nitrophenol	88-75-5	1	µg/L	<1.0	5 µg/L	66.3	48.0	100
EP075(SIM): 2,4-Dimethylphenol	105-67-9	1	µg/L	<1.0	5 µg/L	81.6	49.0	99.0
EP075(SIM): 2,4-Dichlorophenol	120-83-2	1	µg/L	<1.0	5 µg/L	75.0	53.0	105
EP075(SIM): 2,6-Dichlorophenol	87-65-0	1	µg/L	<1.0	5 µg/L	76.1	57.0	105



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP075(SIM)A: Phenolic Compounds (QCLot: 4434230) - continued								
EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	1	µg/L	<1.0	5 µg/L	75.9	53.0	99.0
EP075(SIM): 2,4,6-Trichlorophenol	88-06-2	1	µg/L	<1.0	5 µg/L	68.0	50.0	106
EP075(SIM): 2,4,5-Trichlorophenol	95-95-4	1	µg/L	<1.0	5 µg/L	69.4	51.0	105
EP075(SIM): Pentachlorophenol	87-86-5	2	µg/L	<2.0	10 µg/L	47.6	10.0	95.0
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4434230)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	77.6	50.0	94.0
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	81.2	63.6	114
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	85.3	62.2	113
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	82.6	63.9	115
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	91.3	62.6	116
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	83.3	64.3	116
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	97.0	63.6	118
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	96.0	63.1	118
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	88.8	64.1	117
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	86.0	62.5	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	1	µg/L	<1.0	5 µg/L	71.2	61.7	119
	205-82-3							
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	78.5	63.0	115
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	87.9	63.3	117
EP075(SIM): Indeno(1,2,3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	89.1	59.9	118
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	93.1	61.2	117
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	86.7	59.1	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4434231)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	72.0	55.8	112
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	95.4	71.6	113
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	90.0	56.0	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4442886)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	75.9	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4434231)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	74.8	57.9	119
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	94.3	62.5	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	87.1	61.5	121
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4442886)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	75.6	75.0	127
EP080: BTEXN (QCLot: 4442886)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	90.3	70.0	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	93.4	69.0	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	95.1	70.0	120

Matrix Spike (MS) Report

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 4441526)							
ES2222494-002	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	91.1	70.0	130
		EG020A-F: Beryllium	7440-41-7	1 mg/L	98.4	70.0	130
		EG020A-F: Barium	7440-39-3	1 mg/L	91.4	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	92.8	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	91.7	70.0	130
		EG020A-F: Cobalt	7440-48-4	1 mg/L	92.2	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	92.0	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	92.5	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	92.6	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	90.6	70.0	130
		EG020A-F: Vanadium	7440-62-2	1 mg/L	92.2	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	90.4	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 4441527)							
ES2222495-001	EMB13	EG035F: Mercury	7439-97-6	0.01 mg/L	86.0	70.0	130
EP067: Glycols (QCLot: 4443174)							
ES2222495-001	EMB13	EP067: 2-Ethoxyethyl acetate	111-15-9	100 mg/L	118	37.5	146
		EP067: 2-Butoxyethanol	111-76-2	100 mg/L	114	43.6	151
		EP067: Propylene glycol	57-55-6	100 mg/L	116	69.4	137
		EP067: Ethylene glycol	107-21-1	100 mg/L	116	59.9	140
		EP067: Diethylene glycol monobutyl ether	112-34-5	100 mg/L	114	56.8	147
		EP067: Diethylene glycol	111-46-6	100 mg/L	116	46.9	150
		EP067: Triethylene glycol	112-27-6	100 mg/L	124	32.2	156
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4442886)							
ES2222495-003	QC01A	EP080: C6 - C9 Fraction	----	325 µg/L	87.0	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4442886)							



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4442886) - continued							
ES2222495-003	QC01A	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	83.8	70.0	130
EP080: BTEXN (QCLot: 4442886)							
ES2222495-003	QC01A	EP080: Benzene	71-43-2	25 µg/L	93.7	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	91.8	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	94.2	70.0	130
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	92.7	70.0	130
			106-42-3				
		EP080: ortho-Xylene	95-47-6	25 µg/L	97.7	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	95.8	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES2222495	Page	: 1 of 5
Client	: GREENCAP-NAA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: VARUN BHAGWAT	Telephone	: +61 2 8784 8555
Project	: J174436 Groundwater Monitoring	Date Samples Received	: 01-Jul-2022
Site	: 800 Berrimah Rd. East Arm	Issue Date	: 08-Jul-2022
Sampler	: VARUN BHAGWAT	No. of samples received	: 3
Order number	: 303979	No. of samples analysed	: 3

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- **NO** Matrix Spike outliers occur.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.



Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
PAH/Phenols (GC/MS - SIM)	0	11	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	13	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
PAH/Phenols (GC/MS - SIM)	0	11	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	13	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: **✖** = Holding time breach ; **✔** = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020A-F) EMB13, EMB14	30-Jun-2022	----	----	----	06-Jul-2022	27-Dec-2022	✓
EG035F: Dissolved Mercury by FIMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG035F) EMB13, EMB14	30-Jun-2022	----	----	----	07-Jul-2022	28-Jul-2022	✓
EP067: Glycols							
VOC Vial - unpreserved (EP067) EMB13, EMB14	30-Jun-2022	06-Jul-2022	07-Jul-2022	✓	06-Jul-2022	07-Jul-2022	✓
EP075(SIM)A: Phenolic Compounds							
Amber Glass Bottle - Unpreserved (EP075(SIM)) QC01A	30-Jun-2022	01-Jul-2022	07-Jul-2022	✓	06-Jul-2022	10-Aug-2022	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM)) QC01A	30-Jun-2022	01-Jul-2022	07-Jul-2022	✓	06-Jul-2022	10-Aug-2022	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071) QC01A	30-Jun-2022	01-Jul-2022	07-Jul-2022	✓	06-Jul-2022	10-Aug-2022	✓
Clear glass VOC vial - HCl (EP080) QC01A	30-Jun-2022	07-Jul-2022	14-Jul-2022	✓	07-Jul-2022	14-Jul-2022	✓

Page : 3 of 5
 Work Order : ES2222495
 Client : GREENCAP-NAA PTY LTD
 Project : J174436 Groundwater Monitoring



Matrix: **WATER** Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071) QC01A	30-Jun-2022	01-Jul-2022	07-Jul-2022	✓	06-Jul-2022	10-Aug-2022	✓
Clear glass VOC vial - HCl (EP080) QC01A	30-Jun-2022	07-Jul-2022	14-Jul-2022	✓	07-Jul-2022	14-Jul-2022	✓
EP080: BTEXN							
Clear glass VOC vial - HCl (EP080) QC01A	30-Jun-2022	07-Jul-2022	14-Jul-2022	✓	07-Jul-2022	14-Jul-2022	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Dissolved Mercury by FIMS	EG035F	2	13	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Glycols by GCMS	EP067	1	3	33.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	11	0.00	10.00	✗	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	13	0.00	10.00	✗	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Dissolved Mercury by FIMS	EG035F	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Glycols by GCMS	EP067	1	3	33.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Dissolved Mercury by FIMS	EG035F	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Glycols by GCMS	EP067	1	3	33.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Dissolved Mercury by FIMS	EG035F	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Glycols by GCMS	EP067	1	3	33.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	11	0.00	5.00	✗	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	13	0.00	5.00	✗	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
Glycols by GCMS	EP067	WATER	In house method for the analysis of Glycols in water by GCMS
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015 The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270 Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260 Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM Schedule B(3)
Preparation Methods	Method	Matrix	Method Descriptions
Sample Preparation for Glycols in water analysis	EP067-PR	WATER	In house. Samples are pre-filtered and diluted 1:1 with methanol. Internal standards are added prior to analysis.
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for purging.

CERTIFICATE OF ANALYSIS

Work Order : **ES2222495**
Client : **GREENCAP-NAA PTY LTD**
Contact : **VARUN BHAGWAT**
Address : **11/14 Winnellie Road**
WINNELLIE NT, AUSTRALIA 0820
Telephone : **----**
Project : **J174436 Groundwater Monitoring**
Order number : **303979**
C-O-C number : **----**
Sampler : **VARUN BHAGWAT**
Site : **800 Berrimah Rd. East Arm**
Quote number : **EN/222**
No. of samples received : **3**
No. of samples analysed : **3**

Page : 1 of 6
Laboratory : Environmental Division Sydney
Contact : Shane Ellis
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61 2 8784 8555
Date Samples Received : 01-Jul-2022 08:00
Date Analysis Commenced : 01-Jul-2022
Issue Date : 08-Jul-2022 18:22



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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Xing Lin	Senior Organic Chemist	Melbourne Organics, Springvale, VIC



General Comments

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

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

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

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

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

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

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP075 (SIM): Where reported, Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- No standard reference exists for the Holding Time of Glycols in waters. ALS takes a conservative approach and applies a holding time of 7 days for analysis.



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				EMB13	EMB14	QC01A	----	----
Sampling date / time				30-Jun-2022 00:00	30-Jun-2022 00:00	30-Jun-2022 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2222495-001	ES2222495-002	ES2222495-003	-----	-----
				Result	Result	Result	----	----
EG020F: Dissolved Metals by ICP-MS								
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	----	----	----
Arsenic	7440-38-2	0.001	mg/L	0.001	<0.001	----	----	----
Boron	7440-42-8	0.05	mg/L	0.06	<0.05	----	----	----
Barium	7440-39-3	0.001	mg/L	0.050	0.224	----	----	----
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	----	----	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	----	----	----
Copper	7440-50-8	0.001	mg/L	0.003	<0.001	----	----	----
Manganese	7439-96-5	0.001	mg/L	0.029	0.003	----	----	----
Nickel	7440-02-0	0.001	mg/L	0.002	<0.001	----	----	----
Lead	7439-92-1	0.001	mg/L	0.002	<0.001	----	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	----	----	----
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	----	----	----
Zinc	7440-66-6	0.005	mg/L	0.015	0.250	----	----	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	----	----	----
EP067: Glycols								
2-Ethoxyethyl acetate	111-15-9	2	mg/L	<2	<2	----	----	----
2-Butoxyethanol	111-76-2	2	mg/L	<2	<2	----	----	----
Propylene glycol	57-55-6	2	mg/L	<2	<2	----	----	----
Ethylene glycol	107-21-1	2	mg/L	<2	<2	----	----	----
Diethylene glycol monobutyl ether	112-34-5	2	mg/L	<2	<2	----	----	----
Diethylene glycol	111-46-6	2	mg/L	<2	<2	----	----	----
Triethylene glycol	112-27-6	2	mg/L	<2	<2	----	----	----
EP075(SIM)A: Phenolic Compounds								
Phenol	108-95-2	1.0	µg/L	----	----	<1.0	----	----
2-Chlorophenol	95-57-8	1.0	µg/L	----	----	<1.0	----	----
2-Methylphenol	95-48-7	1.0	µg/L	----	----	<1.0	----	----
3- & 4-Methylphenol	1319-77-3	2.0	µg/L	----	----	<2.0	----	----
2-Nitrophenol	88-75-5	1.0	µg/L	----	----	<1.0	----	----
2,4-Dimethylphenol	105-67-9	1.0	µg/L	----	----	<1.0	----	----
2,4-Dichlorophenol	120-83-2	1.0	µg/L	----	----	<1.0	----	----



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				EMB13	EMB14	QC01A	----	----
Sampling date / time				30-Jun-2022 00:00	30-Jun-2022 00:00	30-Jun-2022 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2222495-001	ES2222495-002	ES2222495-003	-----	-----
				Result	Result	Result	----	----
EP075(SIM)A: Phenolic Compounds - Continued								
2,6-Dichlorophenol	87-65-0	1.0	µg/L	----	----	<1.0	----	----
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L	----	----	<1.0	----	----
2,4,6-Trichlorophenol	88-06-2	1.0	µg/L	----	----	<1.0	----	----
2,4,5-Trichlorophenol	95-95-4	1.0	µg/L	----	----	<1.0	----	----
Pentachlorophenol	87-86-5	2.0	µg/L	----	----	<2.0	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	1.0	µg/L	----	----	<1.0	----	----
Acenaphthylene	208-96-8	1.0	µg/L	----	----	<1.0	----	----
Acenaphthene	83-32-9	1.0	µg/L	----	----	<1.0	----	----
Fluorene	86-73-7	1.0	µg/L	----	----	<1.0	----	----
Phenanthrene	85-01-8	1.0	µg/L	----	----	<1.0	----	----
Anthracene	120-12-7	1.0	µg/L	----	----	<1.0	----	----
Fluoranthene	206-44-0	1.0	µg/L	----	----	<1.0	----	----
Pyrene	129-00-0	1.0	µg/L	----	----	<1.0	----	----
Benzo(a)anthracene	56-55-3	1.0	µg/L	----	----	<1.0	----	----
Chrysene	218-01-9	1.0	µg/L	----	----	<1.0	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L	----	----	<1.0	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	----	----	<1.0	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L	----	----	<0.5	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	----	----	<1.0	----	----
Dibenz(a,h)anthracene	53-70-3	1.0	µg/L	----	----	<1.0	----	----
Benzo(g,h,i)perylene	191-24-2	1.0	µg/L	----	----	<1.0	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	----	----	<0.5	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	----	----	<0.5	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	----	----	<20	----	----
C10 - C14 Fraction	----	50	µg/L	----	----	<50	----	----
C15 - C28 Fraction	----	100	µg/L	----	----	<100	----	----
C29 - C36 Fraction	----	50	µg/L	----	----	<50	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	----	----	<50	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	----	----	<20	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	----	----	<20	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	EMB13	EMB14	QC01A	----	----
Sampling date / time					30-Jun-2022 00:00	30-Jun-2022 00:00	30-Jun-2022 00:00	----	----
Compound	CAS Number	LOR	Unit		ES2222495-001	ES2222495-002	ES2222495-003	-----	-----
					Result	Result	Result	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
>C10 - C16 Fraction	----	100	µg/L		----	----	<100	----	----
>C16 - C34 Fraction	----	100	µg/L		----	----	<100	----	----
>C34 - C40 Fraction	----	100	µg/L		----	----	<100	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		----	----	<100	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		----	----	<100	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		----	----	<1	----	----
Toluene	108-88-3	2	µg/L		----	----	<2	----	----
Ethylbenzene	100-41-4	2	µg/L		----	----	<2	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		----	----	<2	----	----
ortho-Xylene	95-47-6	2	µg/L		----	----	<2	----	----
^ Total Xylenes	----	2	µg/L		----	----	<2	----	----
^ Sum of BTEX	----	1	µg/L		----	----	<1	----	----
Naphthalene	91-20-3	5	µg/L		----	----	<5	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1.0	%		----	----	26.2	----	----
2-Chlorophenol-D4	93951-73-6	1.0	%		----	----	65.3	----	----
2,4,6-Tribromophenol	118-79-6	1.0	%		----	----	65.5	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1.0	%		----	----	72.7	----	----
Anthracene-d10	1719-06-8	1.0	%		----	----	88.0	----	----
4-Terphenyl-d14	1718-51-0	1.0	%		----	----	85.8	----	----
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%		----	----	112	----	----
Toluene-D8	2037-26-5	2	%		----	----	104	----	----
4-Bromofluorobenzene	460-00-4	2	%		----	----	106	----	----



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	44
2-Chlorophenol-D4	93951-73-6	14	94
2,4,6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

Inter-Laboratory Testing

Analysis conducted by ALS Melbourne, NATA accreditation no. 825, site no. 13778 (Chemistry).

(WATER) EP067: Glycols

Appendix D Groundwater Data 2021/2022

Annual Groundwater Results 2021-2022

Site ID Sampling Round Type		Date	Field parameters									Nutrients					Dissolved major anions						Dissolved major ca		
			SWL	SWL	SWL	pH	Temp	ORP	EC	TDS	DO	NH3	NOx	TKN	TN	TP	Hydroxide Alkalinity as CaCO3	Carbonate Alkalinity as CaCO3	Bicarbonate Alkalinity as CaCO3	Total Alkalinity as CaCO3	Sulfate as SO4	Chloride	Ca	Mg	
			mBTOC	mBGL	mAHD		°C	mV	µS/cm	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
			LOR	-	-	-	-	-	-	-	-	-	0.01	0.05	0.2	0.2	0.01	20	10	20	20	5	1	0.5	0.5
EMB 7	Monthly	28/07/2021	3.201	3.201	3.224	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	28/07/2021	2.838	2.838	3.662	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	28/07/2021	4.864	4.064	3.972	3.96	32.3	177.8	269.2	174.9	24.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	28/07/2021	5.093	4.393	4.162	5.97	32.8	79.1	247.7	161.2	33.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB15	Monthly	28/07/2021	2.320	2.320	4.334	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	25/08/2021	3.147	3.147	3.278	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	25/08/2021	3.189	3.189	3.311	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	25/08/2021	5.258	4.458	3.578	3.81	31.6	187.4	267.7	174.2	19.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	25/08/2021	5.088	4.388	4.167	6.32	32.1	81.5	423.6	275.6	29.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB15	Monthly	25/08/2021	2.542	2.542	4.112	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Quarterly	23/09/2021	2.569	2.569	3.856	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Quarterly	23/09/2021	3.1	3.1	3.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Quarterly	23/09/2021	5.246	4.446	3.59	7.24	31.8	-35.2	281.3	183.09	32.7	0.09	5.8	0.5	6.3	<0.01	<20	<10	<20	<20	<5	77	1	0.8	
EMB 14	Quarterly	23/09/2021	5.518	4.818	3.737	5.41	33.3	93.2	377.6	250.26	18.4	0.09	9.7	1.5	11.2	0.02	<20	<10	<20	<20	<5	67	12	2.3	
EMB 15	Quarterly	23/09/2021	2.557	2.557	4.097	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	20/10/2021	3.602	3.602	2.823	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	20/10/2021	3.154	3.154	3.346	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	20/10/2021	5.268	4.468	3.568	3.82	33.1	137.8	281.7	182.65	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	20/10/2021	5.587	4.887	3.668	5.63	34.2	369.2	400.1	249.6	39.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	20/10/2021	2.546	2.546	4.108	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	30/11/2021	2.522	2.522	3.903	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	30/11/2021	2.291	2.291	4.209	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	30/11/2021	4.173	3.373	4.663	3.64	33	126.9	275.8	182.65	44.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	30/11/2021	4.546	3.846	4.709	5.93	35	54.6	343.3	221	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	30/11/2021	1.876	1.876	4.778	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Quarterly	17/12/2021	1.631	1.631	4.794	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Quarterly	17/12/2021	2.741	2.741	3.759	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Quarterly	17/12/2021	3.276	2.476	5.56	3.75	33.4	99.4	272.4	176.8	22.1	0.03	5	<0.2	5	0.01	<20	<10	<20	<20	5.3	45	1	0.7	
EMB 14	Quarterly	17/12/2021	3.416	2.716	5.839	6.39	35.1	68	204.7	122.6	33	<0.01	15	0.8	15.8	0.02	<20	<10	26	26	14	6.1	28	1.7	
EMB 15	Quarterly	17/12/2021	1.321	1.321	5.333	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	21/01/2022	1.038	1.038	5.387	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	21/01/2022	1.121	1.121	5.379	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	21/01/2022	2.283	1.483	6.553	3.85	33	58.3	256.1	168.25	7.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	21/01/2022	1.709	1.009	7.546	6.3	34.1	29.6	193.7	125.45	52	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	21/01/2022	0.678	0.678	5.976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	23/02/2022	1.044	1.044	5.381	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	23/02/2022	1.175	1.175	5.325	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	23/02/2022	2.411	1.611	6.425	4.06	31.8	78.3	239.9	154.7	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	23/02/2022	2.034	1.334	7.221	6.46	33.1	36.3	174.2	113.1	20.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	23/02/2022	0.69	0.69	5.964	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Annual	25/03/2022	1.298	1.298	5.127	5.93	32.9	106.3	193.4	131.65	46.5	1.00	1.20	1.00	2.20	0.04	< 20	< 10	150.00	150.00	30.00	42.00	8.80	0.90	
EMB 12	Annual	25/03/2022	1.242	1.242	5.258	6.44	36.5	94.2	390.8	310.65	48.1	0.10	0.33	< 0.2	0.33	0.02	< 20	< 10	98.00	98.00	6.10	9.20	8.30	1.00	
EMB 13	Annual	25/03/2022	2.689	1.889	6.147	4	32.4	82.5	246.1	159.96	26.8	0.08	4.70	0.40	5.10	0.03	< 20	< 10	< 20	< 20	16.00	41.00	2.00	0.70	

Annual Groundwater Results 2021-2022

[illegible]

Annual Groundwater Results 2021-2022

Site ID Sampling Round Type		Date	ations		Dissolved metals																TRH				
			K	Na	Sb	As	Ba	Be	Bo	Cd	Cr	Co	Cu	Pb	Mn	Ni	Se	V	Zn	Hg	C6 - C10 Fraction	C6 - C10 Fraction minus BTEX (F1)	>C10 - C16 Fraction	>C16 - C34 Fraction	
			mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
			LOR	0.5	0.5	1	1	1	1	1	0.1	1	1	1	1	1	1	10	10	5	0.1	20	20	50	100
EMB 7	Monthly	28/07/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 12	Monthly	28/07/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 13	Monthly	28/07/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 14	Monthly	28/07/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB15	Monthly	28/07/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 7	Monthly	25/08/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 12	Monthly	25/08/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 13	Monthly	25/08/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 14	Monthly	25/08/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB15	Monthly	25/08/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 7	Quarterly	23/09/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 12	Quarterly	23/09/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 13	Quarterly	23/09/2021	1	18	<10	<1	51	<1	<50	<0.1	<1	<1	3	2	35	<1	<10	<10	3	<0.1	<20	<20	<50	<100	
EMB 14	Quarterly	23/09/2021	3.6	18	<10	<1	213	<1	<50	<0.1	<1	<1	<1	<1	12	<1	<10	<10	109	<0.1	<20	<20	<50	<100	
EMB 15	Quarterly	23/09/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 7	Monthly	20/10/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 12	Monthly	20/10/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 13	Monthly	20/10/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 14	Monthly	20/10/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 15	Monthly	20/10/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 7	Monthly	30/11/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 12	Monthly	30/11/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 13	Monthly	30/11/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 14	Monthly	30/11/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 15	Monthly	30/11/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 7	Quarterly	17/12/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 12	Quarterly	17/12/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 13	Quarterly	17/12/2021	1.1	18	<1	1	50	<1	50	<0.1	<1	<1	3	<1	29	1	<10	<10	30	<0.1	<20	<20	<50	<100	
EMB 14	Quarterly	17/12/2021	3.2	3.8	<1	<1	363	<1	<50	<0.1	<1	<1	4	<1	3	1	<10	<10	799	<0.1	<20	<20	<50	<100	
EMB 15	Quarterly	17/12/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 7	Monthly	21/01/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 12	Monthly	21/01/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 13	Monthly	21/01/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 14	Monthly	21/01/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 15	Monthly	21/01/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 7	Monthly	23/02/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 12	Monthly	23/02/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 13	Monthly	23/02/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 14	Monthly	23/02/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 15	Monthly	23/02/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 7	Annual	25/03/2022	2.00	22.00	<1	<1	182	<1	530	<0.1	<1	3	1	<1	311	1	<10	<10	15	<0.1	<20	<20	<50	<100	
EMB 12	Annual	25/03/2022	6.20	6.60	<1	<1	255	<1	550	<0.1	<1	<1	<1	<1	1	3	<10	<10	<5	<0.1	<20	<20	<50	<100	
EMB 13	Annual	25/03/2022	1.30	21.00	<1	2	188	<1	720	<0.1	<1	<1	2	1	27	1	<10	<10	13	<0.1	<20	<20	<50	<100	

Annual Groundwater Results 2021-2022

[illegible]

Annual Groundwater Results 2021-2022

Site ID Sampling Round Type		Date				BTEXN							Polycyclic Aromatic Hydrocarbons												
			>C34 - C40 Fraction	>C10 - C40 Fraction (sum)	>C10 - C16 Fraction minus Nap	Benzene	Ethylbenzene	Sum of BTEX	Toluene	Total Xylenes	meta- & para-Xylene	ortho-Xylene	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benz(a)anthracene	Chrysene	Benzo(b+j)fluoranthene	Benzo(k)fluoranthene	
			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
			LOR	100	100	50	1	1	1	1	3	2	1	10	1	1	1	1	1	1	1	1	1	1	1
EMB 7	Monthly	28/07/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 12	Monthly	28/07/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 13	Monthly	28/07/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 14	Monthly	28/07/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB15	Monthly	28/07/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 7	Monthly	25/08/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 12	Monthly	25/08/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 13	Monthly	25/08/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 14	Monthly	25/08/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB15	Monthly	25/08/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 7	Quarterly	23/09/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 12	Quarterly	23/09/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 13	Quarterly	23/09/2021	<100	<100	<50	<1	<1	<1	<1	<3	<2	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
EMB 14	Quarterly	23/09/2021	<100	<100	<50	<1	<1	<1	<1	<3	<2	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
EMB 15	Quarterly	23/09/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 7	Monthly	20/10/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 12	Monthly	20/10/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 13	Monthly	20/10/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 14	Monthly	20/10/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 15	Monthly	20/10/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 7	Monthly	30/11/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 12	Monthly	30/11/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 13	Monthly	30/11/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 14	Monthly	30/11/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 15	Monthly	30/11/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 7	Quarterly	17/12/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 12	Quarterly	17/12/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 13	Quarterly	17/12/2021	<100	<100	<50	<1	<1	<1	<1	<3	<2	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
EMB 14	Quarterly	17/12/2021	<100	<100	<50	<1	<1	<1	<1	<3	<2	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
EMB 15	Quarterly	17/12/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 7	Monthly	21/01/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 12	Monthly	21/01/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 13	Monthly	21/01/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 14	Monthly	21/01/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 15	Monthly	21/01/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 7	Monthly	23/02/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 12	Monthly	23/02/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 13	Monthly	23/02/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 14	Monthly	23/02/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 15	Monthly	23/02/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EMB 7	Annual	25/03/2022	<100	<100	<50	<1	<1	<1	<1	<3	<2	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
EMB 12	Annual	25/03/2022	<100	<100	<50	<1	<1	<1	<1	<3	<2	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
EMB 13	Annual	25/03/2022	<100	<100	<50	<1	<1	<1	<1	<3	<2	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	

Annual Groundwater Results 2021-2022

[illegible]

Annual Groundwater Results 2021-2022

Site ID		Sampling Round Type	Date					Perfluoroalkyl Sulfonic Acids						Perfluoroalkyl Carboxylic Acids											
				Benzo(a)pyrene	Indeno(1.2.3.cd)pyrene	Dibenz(a,h)anthracene	Benzo(g,h,i)perylene	Sum of PAHs	PFBS	PFPeS	PFHxS	PFHpS	PFOS	PFDS	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUnDA	PFDoDA	PFTTrDA	PFTeDA
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
			LOR	1	1	1	1	1	1	1	1	1	1	1	5	1	1	1	1	1	1	1	1	1	1
EMB 7	Monthly	28/07/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	28/07/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	28/07/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	28/07/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB15	Monthly	28/07/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	25/08/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	25/08/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	25/08/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	25/08/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB15	Monthly	25/08/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Quarterly	23/09/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Quarterly	23/09/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Quarterly	23/09/2021	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1	5.5	5.4	1.7	1.2	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
EMB 14	Quarterly	23/09/2021	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.56	1.4	1.1	1	0.29	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
EMB 15	Quarterly	23/09/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	20/10/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	20/10/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	20/10/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	20/10/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	20/10/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	30/11/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	30/11/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	30/11/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	30/11/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	30/11/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Quarterly	17/12/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Quarterly	17/12/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Quarterly	17/12/2021	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.8	4.5	3.8	1.4	0.97	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
EMB 14	Quarterly	17/12/2021	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.17	0.28	0.21	0.27	0.09	0.08	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
EMB 15	Quarterly	17/12/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	21/01/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	21/01/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	21/01/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	21/01/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	21/01/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	23/02/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	23/02/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	23/02/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	23/02/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	23/02/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Annual	25/03/2022	<0.5	<1.0	<1.0	<1.0	<0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.9	5.3	12	1.3	3	0.03	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
EMB 12	Annual	25/03/2022	<0.5	<1.0	<1.0	<1.0	<0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.09	0.06	0.04	0.03	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
EMB 13	Annual	25/03/2022	<0.5	<1.0	<1.0	<1.0	<0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	2.1	12	11	3.4	2.2	0.06	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Annual Groundwater Results 2021-2022

[illegible]

Annual Groundwater Results 2021-2022

Site ID		Sampling Round Type	Date	Perfluoroalkyl Sulfonamides							(n:2) Fluorotelomer Sulfonic Acids				PFAS Sums			Phenolic Compounds							
				FOSA	MeFOSA	EtFOSA	MeFOSE	EtFOSE	MeFOSAA	EtFOSAA	4:2 FTS	6:2 FTS	8:2 FTS	10:2 FTS	Sum of PFAS	Sum of PFHxS and PFOS	Sum of PFAS (WA DER List)	Phenol	2-Chlorophe nol	2-Methylph enol	3- & 4-Methylph enol	2-Nitrophen ol	2,4-Dimethylp henol	2,4-Dichlorop henol	2,6-Dichlorop henol
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
		LOR		5	5	5	5	5	5	5	1	5	1	1	100	1	5	3	100	30	6	10	3	30	3
EMB 7	Monthly	28/07/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	28/07/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	28/07/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	28/07/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB15	Monthly	28/07/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	25/08/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	25/08/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	25/08/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	25/08/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB15	Monthly	25/08/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Quarterly	23/09/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Quarterly	23/09/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Quarterly	23/09/2021	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.04	40	0.61	<0.01	55.49	<0.01	55.41	<3	<3	<3	<6	10	<3	<3	<3
EMB 14	Quarterly	23/09/2021	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	4.45	<0.01	4.35	<3	<3	<3	<6	10	<3	<3	<3
EMB 15	Quarterly	23/09/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	20/10/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	20/10/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	20/10/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	20/10/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	20/10/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	30/11/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	30/11/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	30/11/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	30/11/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	30/11/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Quarterly	17/12/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Quarterly	17/12/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Quarterly	17/12/2021	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.03	1.6	1.1	<0.01	14.23	<0.01	14.17	<3	<3	<3	<6	<10	<3	<3	<3
EMB 14	Quarterly	17/12/2021	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	1.1	<0.01	1.02	<3	<3	<3	<6	<10	<3	<3	<3
EMB 15	Quarterly	17/12/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	21/01/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	21/01/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	21/01/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	21/01/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	21/01/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Monthly	23/02/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 12	Monthly	23/02/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 13	Monthly	23/02/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 14	Monthly	23/02/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 15	Monthly	23/02/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EMB 7	Annual	25/03/2022	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.4	16	0.14	< 0.01	40.07	< 0.01	39.64	<3	<3	<3	<6	<10	<3	<3	<3
EMB 12	Annual	25/03/2022	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.01	< 0.05	< 0.01	< 0.01	0.22	< 0.01	0.22	<3	<3	<3	<6	<10	<3	<3	<3
EMB 13	Annual	25/03/2022	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.1	16	0.7	< 0.01	47.56	< 0.01	47.4	<3	<3	<3	<6	<10	<3	<3	<3

Annual Groundwater Results 2021-2022

[illegible]

Annual Groundwater Results 2021-2022

[illegible]

Annual Groundwater Results 2021-2022

[illegible]

Appendix E Stormwater Procedure

Appendix F Calibration Records (GRR)

Reviewed By:

[illegible]

Weekly Laboratory pH Meter Calibration Log

Date	pH Meter UIN	Ref Buffer 4.0	Ref Buffer 7.0	Ref Buffer 10.0	Calibrated Y/N	Analyst	Entered	COMMENTS
		Actual Reading	Actual Reading	Actual Reading				
06/01/21	pHCM-01	4.037	6.949	10.034	N	dh	✓	—
07/01/21	MPM-01	4.06	7.03	10.07	N	dh	✓	—
08/01/21	MPM-03	4.00	6.91	10.00	Y	dh	✓	—
11/01/21	MPM-01	3.90	7.03	10.04	N	dh	✓	—
12/01/21	pHCM-01	3.995	6.977	10.018	N	dh	✓	—
12/01/21	MPM-03	3.94	7.05	9.98	N	dh	✓	—
18/01/21	pHCM-01	3.987	6.901	9.949	N	dh	✓	—
18/01/21	MPM-01	4.13	7.08	10.04	N	dh	✓	—
18/01/21	MPM-03	4.00	7.15	10.00	Y	dh	✓	—
25/01/21	MPM-01	4.07	7.04	10.01	Y	dh	✓	—
25/01/21	pHCM-01	3.926	7.00	10.00	Y	dh	✓	—
28/01/21	MPM-03	4.08	7.06	10.01	N	dh	✓	—
1/3/21	pHCM-01	4.00	7.01	10.00	Y	dh	✓	—
8/3/21	"	4.02	7.01	10.02	Y	dh	✓	—
15/3/21	"	4.00	7.00	10.00	Y	dh	✓	—
22/3/21	"	4.03	7.05	10.05	Y	dh	✓	—
29/3/21	"	4.05	7.01	10.02	Y	dh		—
5/4/21	"	4.06	7.00	10.00	Y	dh		—
12/4	"	4.02	7.00	10.05	Y	dh		—
19/4	"	4.00	7.03	10.02	X	dh		—
26/4	"	4.05	7.03	10.01	Y	dh		—
3/5	"	4.02	7.00	10.00	Y	dh		—
10/5	"	4.01	7.05	10.01	X	dh		—
17/5	"	4.00	7.06	10.02	X	dh		—
24/5	"	4.00	7.01	10.05	Y	dh		—
31/5	"	4.00	7.00	10.07	Y	dh		—
7/6	"	4.01	7.00	10.00	Y	dh		—
14/6	"	4.02	7.05	10.05	Y	dh		—
21/6	"	4.05	7.06	10.06	Y	dh		—
28/6	"	4.00	7.05	10.05	Y	dh		—
5/7	"	4.03	7.06	10.02	Y	dh		—
12/7	"	4.04	7.07	10.06	Y	dh		—
19/7	"	4.06	7.05	10.02	Y	dh		—
26/7	"	4.08	7.06	10.03	X	dh		—

Daily Lab pH Meter Calibration Log
 Created By: Ann Norton
 Date Created: 06/10/2020
 Approved By:

Reviewed By: AN

Review Date: 29/12/2020

Daily Laboratory pH Meter Calibration Log

Date	pH Meter UIN	Ref Buffer 4.0	Ref Buffer 7.0	Ref Buffer 10.0	Calibrated Y/N	Analyst	Entered	COMMENTS
		Actual Reading	Actual Reading	Actual Reading				
2/8	PHCM-01	3.76	7.01	9.97	✓	dre		
9/8		4.01	6.97	9.89	✓	dre		
16/8		3.96	6.89	10.01	✓	dre		
23/8	✓	3.98	6.97	10.01	✓	dre		
30/8		3.86	6.89	9.87	✓	dre		
6/9		4.00	7.01	9.86	✓	dre		
13/9	✓	3.98	6.98	9.80	✓	dre		
20/9		3.94	6.93	9.94	✓	dre		
27/9		3.99	6.99	10.01	✓	dre		
3/10		3.98	6.98	10.02	✓	dre		
11/10		4.10	6.75	9.83	✓	dre		
19/10	✓	4.00	6.91	9.80	✓	EZ		
25/10		4.00	6.95	9.95	✓	EZ		
01/11		4.01	6.97	10.08	✓	EZ		
8/11		3.97	6.86	9.94	✓	EZ		
15/11		3.86	6.79	10.00	✓	dre		
22/11		3.79	6.86	9.86	✓	dre		
29/11		3.84	6.91	10.15	✓	dre		
6/12	✓	4.33	6.30	9.98	✓	dre		
13/12	✓	4.24	6.27	9.84	✓	dre		
21/12	✓	4.30	6.17	10.07	✓	dre		
27/12	✓	4.25	6.20	10.06	✓	dre		
4/1	"	4.16	6.35	9.82	✓	dre		
10/1	"	4.26	6.20	9.88	✓	dre		
17/1	"	4.25	6.19	9.96	✓	dre		
24/1	"	4.26	6.15	10.02	✓	dre		
31/1		4.23	7.29	10.22	✓	dre		
8/2	"	4.40	6.03	10.18	✓	dre		
14/2	✓	4.39	5.90	9.96	✓	dre		
22/2	✓	4.32	6.22	10.03	✓	dre		
1/3	"	4.30	6.36	10.02	✓	dre		
8/3	"	4.23	6.42	9.90	✓	dre		
15/3	"	4.26	6.25	10.00	✓	dre		
21/3		4.31	6.05	9.98	✓	dre		

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Weekly Laboratory Conductivity Meter Calibration Log

Date	Conductivity Meter UIN	Ref Standard 0.0 (µs/cm)	Air Temp °C	Ref Standard 1413 (µs/cm)	Ref Std Temp °C	Ref Standard 5000 (µs/cm)	Ref Std Temp °C	Recalibrated Y/N	Analyst	Entered into Template	COMMENTS
		Actual Reading		Actual Reading		Actual Reading					
20-9	PECM-01			1248	22.5			Y	SNR		
27-9	"			1261	22.0			Y	chr		
3-10	"			1417	22.5			Y	chr		
11-10	"			1425	22.6			Y	chr		
25/10	"			1399	25			Y	Z		
01/11	"			1338	24.7			Y	Z		
15/11	"			1349	23.6			Y	chr		
22/11	"			1384	24.1			Y	chr		
29/11	"			1376	24.2			X	chr		
6/12	"			1324	24.5			Y	chr		
13/12	"			1318	23.0			Y	chr		
21-12	"			1329	23.1			Y	chr		
4/1/22	"			1290	24.5			Y	chr		
10-1-22	"			1236	24.3			Y	chr		
17-1-22	"			1115	24.4			Y	chr		
24-1-22	"			1297	22.9			Y	chr		
31-1-22	"			1282	24.4			Y	chr		
8-2-22	"			1320	24.2			Y	chr		
14-2	"			1272	24			Y	chr		
21-2	"			1169	23.5			Y	chr		
1-3	"			1227	23.3			Y	chr		
7-3	"			1198	24.8			Y	chr		
15-3	"			1298	24.2			Y	chr		
21-3	"			1268	24.3			Y	chr		
28-3	"			1322	25.1			Y	chr		
4-4	"			1258	24.6			Y	chr		
11-4	"			1688	24.2			Y	chr		
26-4	"			1202	23.5			Y	chr		

[illegible]



Appendix G Surface Water Laboratory Results

Global Resource Recovery Pty Ltd
9-11 Maria Street
Laverton North
VIC 3026



NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention: cc ALL INV's Adrian Phillips

Report 830099-W
Project name GLOBAL RESOURCE RECOVERY
Project ID PROCESSING DWN
Received Date Oct 05, 2021

Client Sample ID			G01SWMP1
Sample Matrix			Water
Eurofins Sample No.			M21-Oc11768
Date Sampled			Oct 05, 2021
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons			
TRH C6-C9	0.02	mg/L	< 2
TRH C10-C14	0.05	mg/L	40
TRH C15-C28	0.1	mg/L	9.8
TRH C29-C36	0.1	mg/L	2.0
TRH C10-C36 (Total)	0.1	mg/L	51.8
Naphthalene ^{N02}	0.01	mg/L	< 1
TRH C6-C10	0.02	mg/L	< 2
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	< 2
TRH >C10-C16	0.05	mg/L	35
TRH >C10-C16 less Naphthalene (F2) ^{N01}	0.05	mg/L	35
TRH >C16-C34	0.1	mg/L	9.1
TRH >C34-C40	0.1	mg/L	0.8
TRH >C10-C40 (total)*	0.1	mg/L	44.9
BTEX			
Benzene	0.001	mg/L	< 0.1
Toluene	0.001	mg/L	< 0.1
Ethylbenzene	0.001	mg/L	< 0.1
m&p-Xylenes	0.002	mg/L	< 0.2
o-Xylene	0.001	mg/L	< 0.1
Xylenes - Total*	0.003	mg/L	< 0.3
4-Bromofluorobenzene (surr.)	1	%	114
Polycyclic Aromatic Hydrocarbons			
Acenaphthene	0.001	mg/L	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001
Anthracene	0.001	mg/L	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001
Benzo(b&j)fluoranthene ^{N07}	0.001	mg/L	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001
Chrysene	0.001	mg/L	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001
Fluoranthene	0.001	mg/L	< 0.001
Fluorene	0.001	mg/L	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001

Client Sample ID			G01-SWMP1
Sample Matrix			Water
Eurofins Sample No.			M21-Oc11768
Date Sampled			Oct 05, 2021
Test/Reference	LOR	Unit	
Polycyclic Aromatic Hydrocarbons			
Naphthalene	0.001	mg/L	0.004
Phenanthrene	0.001	mg/L	< 0.001
Pyrene	0.001	mg/L	< 0.001
Total PAH*	0.001	mg/L	0.004
2-Fluorobiphenyl (surr.)	1	%	60
p-Terphenyl-d14 (surr.)	1	%	98
Glycols*			
Di-Ethylene Glycol*	20	mg/L	< 200
Ethylene glycol*	20	mg/L	8500
Propylene glycol*	20	mg/L	< 200
Triethylene glycol*	20	mg/L	< 200
Polychlorinated Biphenyls			
Aroclor-1016	0.005	mg/L	< 0.005
Aroclor-1221	0.005	mg/L	< 0.005
Aroclor-1232	0.005	mg/L	< 0.005
Aroclor-1242	0.005	mg/L	< 0.005
Aroclor-1248	0.005	mg/L	< 0.005
Aroclor-1254	0.005	mg/L	< 0.005
Aroclor-1260	0.005	mg/L	< 0.005
Total PCB*	0.005	mg/L	< 0.005
Dibutylchloroendate (surr.)	1	%	64
Tetrachloro-m-xylene (surr.)	1	%	100
Phenols (Halogenated)			
2-Chlorophenol	0.003	mg/L	< 0.003
2,4-Dichlorophenol	0.003	mg/L	< 0.003
2,4,5-Trichlorophenol	0.01	mg/L	< 0.01
2,4,6-Trichlorophenol	0.01	mg/L	< 0.01
2,6-Dichlorophenol	0.003	mg/L	< 0.003
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01
Pentachlorophenol	0.01	mg/L	< 0.01
Tetrachlorophenols - Total	0.03	mg/L	< 0.03
Total Halogenated Phenol*	0.01	mg/L	< 0.01
Phenols (non-Halogenated)			
2-Cyclohexyl-4,6-dinitrophenol	0.1	mg/L	< 0.1
2-Methyl-4,6-dinitrophenol	0.03	mg/L	< 0.03
2-Nitrophenol	0.01	mg/L	< 0.01
2,4-Dimethylphenol	0.003	mg/L	0.42
2,4-Dinitrophenol	0.03	mg/L	< 0.03
2-Methylphenol (o-Cresol)	0.003	mg/L	0.75
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	1.6
Total cresols*	0.01	mg/L	2.4
4-Nitrophenol	0.03	mg/L	< 0.03
Dinoseb	0.1	mg/L	< 0.1
Phenol	0.003	mg/L	1.8
Phenol-d6 (surr.)	1	%	55
Total Non-Halogenated Phenol*	0.1	mg/L	6.97

Client Sample ID			G01-SWMP1
Sample Matrix			Water
Eurofins Sample No.			M21-Oc11768
Date Sampled			Oct 05, 2021
Test/Reference	LOR	Unit	
Ammonia (as N)	0.01	mg/L	0.60
Chloride	1	mg/L	600
Cyanide (total)	0.005	mg/L	< 0.005
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.5
Phosphate total (as P)	0.01	mg/L	2.4
Sulphate (as SO ₄)	5	mg/L	41
Total Dissolved Solids Dried at 180°C ± 2°C	10	mg/L	3300
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	3.3
Total Nitrogen (as N)*	0.2	mg/L	3.3
Total Suspended Solids Dried at 103–105°C	1	mg/L	29
Alkalinity (speciated)			
Bicarbonate Alkalinity (as CaCO ₃)	20	mg/L	560
Carbonate Alkalinity (as CaCO ₃)	10	mg/L	< 10
Hydroxide Alkalinity (as CaCO ₃)	20	mg/L	< 20
Total Alkalinity (as CaCO ₃)	20	mg/L	560
Heavy Metals			
Antimony	0.005	mg/L	< 0.05
Antimony (filtered)	0.005	mg/L	< 0.05
Arsenic	0.001	mg/L	0.011
Arsenic (filtered)	0.001	mg/L	< 0.01
Barium	0.02	mg/L	1.5
Barium (filtered)	0.02	mg/L	1.4
Beryllium	0.001	mg/L	< 0.01
Beryllium (filtered)	0.001	mg/L	< 0.01
Boron	0.05	mg/L	3.5
Boron (filtered)	0.05	mg/L	3.2
Cadmium	0.0002	mg/L	< 0.002
Cadmium (filtered)	0.0002	mg/L	< 0.002
Chromium	0.001	mg/L	0.021
Chromium (filtered)	0.001	mg/L	0.017
Cobalt	0.001	mg/L	0.023
Cobalt (filtered)	0.001	mg/L	0.023
Copper	0.001	mg/L	< 0.05
Copper (filtered)	0.001	mg/L	< 0.05
Lead	0.001	mg/L	0.010
Lead (filtered)	0.001	mg/L	< 0.01
Manganese	0.005	mg/L	6.1
Manganese (filtered)	0.005	mg/L	6.0
Mercury	0.0001	mg/L	0.0026
Mercury (filtered)	0.0001	mg/L	0.0016
Nickel	0.001	mg/L	0.13
Nickel (filtered)	0.001	mg/L	0.12
Selenium	0.001	mg/L	0.011
Selenium (filtered)	0.001	mg/L	< 0.01
Vanadium	0.005	mg/L	< 0.05
Vanadium (filtered)	0.005	mg/L	< 0.05
Zinc	0.005	mg/L	67
Zinc (filtered)	0.005	mg/L	65

Client Sample ID			G01-SWMP1
Sample Matrix			Water
Eurofins Sample No.			M21-Oc11768
Date Sampled			Oct 05, 2021
Test/Reference	LOR	Unit	
Alkali Metals			
Calcium	0.5	mg/L	470
Magnesium	0.5	mg/L	20
Potassium	0.5	mg/L	29
Sodium	0.5	mg/L	510
Perfluoroalkyl carboxylic acids (PFCAs)			
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	< 0.05
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	0.12
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	0.14
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.01	ug/L	^{N09} 0.03
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	^{N09} 0.03
Perfluorononanoic acid (PFNA) ^{N11}	0.01	ug/L	< 0.01
Perfluorodecanoic acid (PFDA) ^{N11}	0.01	ug/L	< 0.01
Perfluoroundecanoic acid (PFUnDA) ^{N11}	0.01	ug/L	< 0.01
Perfluorododecanoic acid (PFDoDA) ^{N11}	0.01	ug/L	< 0.01
Perfluorotridecanoic acid (PFTTrDA) ^{N15}	0.01	ug/L	< 0.01
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	0.01	ug/L	< 0.01
13C4-PFBA (surr.)	1	%	121
13C5-PFPeA (surr.)	1	%	125
13C5-PFHxA (surr.)	1	%	62
13C4-PFHpA (surr.)	1	%	99
13C8-PFOA (surr.)	1	%	115
13C5-PFNA (surr.)	1	%	127
13C6-PFDA (surr.)	1	%	126
13C2-PFUnDA (surr.)	1	%	131
13C2-PFDoDA (surr.)	1	%	123
13C2-PFTeDA (surr.)	1	%	101
Perfluoroalkyl sulfonamido substances			
Perfluorooctane sulfonamide (FOSA) ^{N11}	0.05	ug/L	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	0.05	ug/L	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	0.05	ug/L	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE) ^{N11}	0.05	ug/L	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE) ^{N11}	0.05	ug/L	< 0.05
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	0.05	ug/L	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	0.05	ug/L	< 0.05
13C8-FOSA (surr.)	1	%	91
D3-N-MeFOSA (surr.)	1	%	78
D5-N-EtFOSA (surr.)	1	%	92
D7-N-MeFOSE (surr.)	1	%	81
D9-N-EtFOSE (surr.)	1	%	75
D5-N-EtFOSAA (surr.)	1	%	118
D3-N-MeFOSAA (surr.)	1	%	133
Perfluoroalkyl sulfonic acids (PFSAs)			
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	< 0.01
Perfluorononanesulfonic acid (PFNS) ^{N15}	0.01	ug/L	< 0.01
Perfluoropropanesulfonic acid (PFPrS) ^{N15}	0.01	ug/L	0.03
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.01	ug/L	< 0.01

Client Sample ID			G01 SWMP1
Sample Matrix			Water
Eurofins Sample No.			M21-Oc11768
Date Sampled			Oct 05, 2021
Test/Reference	LOR	Unit	
Perfluoroalkyl sulfonic acids (PFASs)			
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	^{N09} 0.03
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	< 0.01
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	^{G01} < 0.05
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 0.01
13C3-PFBS (surr.)	1	%	54
18O2-PFHxS (surr.)	1	%	116
13C8-PFOS (surr.)	1	%	125
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	0.01	ug/L	^{G01} < 0.1
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA) ^{N11}	0.05	ug/L	0.79
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	0.01	ug/L	^{G01} < 0.1
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	0.01	ug/L	< 0.01
13C2-4:2 FTSA (surr.)	1	%	113
13C2-6:2 FTSA (surr.)	1	%	98
13C2-8:2 FTSA (surr.)	1	%	110
13C2-10:2 FTSA (surr.)	1	%	95
PFASs Summations			
Sum (PFHxS + PFOS)*	0.01	ug/L	< 0.05
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	< 0.05
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	0.06
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	1.14
Sum of PFASs (n=30)*	0.1	ug/L	1.17

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B4A			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Oct 07, 2021	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Oct 07, 2021	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Oct 07, 2021	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	Oct 07, 2021	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Melbourne	Oct 07, 2021	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (Halogenated)	Melbourne	Oct 07, 2021	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (non-Halogenated)	Melbourne	Oct 07, 2021	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Glycols*	Melbourne	Oct 07, 2021	7 Days
- Method: GLYCOLS- US EPA SW846 METHOD 8000 GC-FID.			
Polychlorinated Biphenyls	Melbourne	Oct 07, 2021	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8082)			
Ammonia (as N)	Melbourne	Oct 07, 2021	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Cyanide (total)	Melbourne	Oct 07, 2021	14 Days
- Method: LTM-INO-4020 Total Free WAD Cyanide by CFA			
Total Suspended Solids Dried at 103–105°C	Melbourne	Oct 07, 2021	7 Days
- Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry			
Heavy Metals	Melbourne	Oct 07, 2021	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals (filtered)	Melbourne	Oct 07, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Mobil Metals : Metals M15	Melbourne	Oct 07, 2021	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins Suite B11C: Na/K/Ca/Mg	Melbourne	Oct 07, 2021	180 Days
- Method: LTM-MET-3010 Alkali Metals by ICP-AES			
Eurofins Suite B11E: Cl/SO4/Alkalinity			
Chloride	Melbourne	Oct 07, 2021	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
Sulphate (as SO4)	Melbourne	Oct 07, 2021	28 Days
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
Alkalinity (speciated)	Melbourne	Oct 07, 2021	14 Days
- Method: LTM-INO-4250 Alkalinity by Electrometric Titration			
Total Nitrogen Set (as N)			
Nitrate & Nitrite (as N)	Melbourne	Oct 07, 2021	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Total Kjeldahl Nitrogen (as N)	Melbourne	Oct 07, 2021	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Eurofins Suite B19A: Total N (TKN, NOx), Total P			
Phosphate total (as P)	Melbourne	Oct 07, 2021	28 Days
- Method: LTM-INO-4040 Phosphate by CFA			
Total Dissolved Solids Dried at 180°C ± 2°C	Melbourne	Oct 07, 2021	28 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			
Per- and Polyfluoroalkyl Substances (PFASs)			

Description	Testing Site	Extracted	Holding Time
Perfluoroalkyl carboxylic acids (PFCAs) - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Oct 07, 2021	28 Days
Perfluoroalkyl sulfonamido substances - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Oct 07, 2021	28 Days
Perfluoroalkyl sulfonic acids (PFSAs) - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Oct 07, 2021	28 Days
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs) - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Oct 07, 2021	28 Days
PFASs Summations - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Oct 07, 2021	

Company Name:	Global Resource Recovery Pty Ltd	Order No.:	GRR DARWIN	Received:	Oct 5, 2021 2:58 PM
Address:	9-11 Maria Street Laverton North VIC 3026	Report #:	830099	Due:	Oct 8, 2021
		Phone:	03 9369 4545	Priority:	Overnight
		Fax:		Contact Name:	cc ALL INV's Adrian Phillips
Project Name:	GLOBAL RESOURCE RECOVERY				
Project ID:	PROCESSING DWN				

Eurofins Analytical Services Manager : Michael Morrison

Sample Detail						Total Dissolved Solids Dried at 100°C ± 2°C																																										
						Eurofins Suite B11.C: Na/K/Ca/Mg	Per- and Polyfluorinated Substances (PFASs)	Eurofins Suite B11.E: Cl/SO4/Alkalinity	Eurofins Suite B19.A: Total N (TKN, NOx),	Eurofins Suite B4A	Polychlorinated Biphenyls	Glycols*	Zinc (filtered)	Zinc	Vanadium (filtered)	Vanadium	Total Suspended Solids Dried at 103–105°C	Selenium (filtered)	Selenium	Nickel (filtered)	Nickel	Mercury (filtered)	Mercury	Manganese (filtered)	Manganese	Lead (filtered)	Lead	Cyanide (total)	Copper (filtered)	Copper	Cobalt (filtered)	Cobalt	Chromium (filtered)	Chromium	Cadmium (filtered)	Cadmium	Boron (filtered)	Boron	Beryllium (filtered)	Beryllium	Barium (filtered)	Barium	Arsenic (filtered)	Arsenic	Antimony (filtered)	Antimony	Ammonia (as N)	
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Sydney Laboratory - NATA # 1261 Site # 18217																																																
Brisbane Laboratory - NATA # 1261 Site # 20794																																																
Mayfield Laboratory - NATA # 1261 Site # 25079																																																
Perth Laboratory - NATA # 2377 Site # 2370																																																
External Laboratory																																																
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID																																											
1	SWMP1	Oct 05, 2021		Water	M21-Oc11768	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
Test Counts						1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs..

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Comments
Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
G01	The LORs have been raised due to matrix interference
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
N09	Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).

Authorised by:

Emily Daos	Analytical Services Manager
Vivian Wang	Senior Analyst-Volatile (VIC)
Scott Beddoes	Senior Analyst-Inorganic (VIC)
Joseph Edouard	Senior Analyst-Organic (VIC)
Emily Rosenberg	Senior Analyst-Metal (VIC)
Joseph Edouard	Senior Analyst-PFAS (VIC)



Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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Global Resource Recovery Pty Ltd
9-11 Maria Street
Laverton North
VIC 3026



NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention: - Rajas Patankar

Report **846711-W**
Project name **GLOBAL RESOURCE RECOVERY**
Project ID **PROCESSING DWN**
Received Date **Dec 02, 2021**

Client Sample ID			SWMP	BATCH BUND
Sample Matrix			Trade Waste	Trade Waste
Eurofins Sample No.			M21-De08242	M21-De08243
Date Sampled			Dec 02, 2021	Dec 02, 2021
Test/Reference	LOR	Unit		
BTEX				
Benzene	0.001	mg/L	< 0.1	< 0.1
Toluene	0.001	mg/L	< 0.1	< 0.1
Ethylbenzene	0.001	mg/L	< 0.1	< 0.1
m&p-Xylenes	0.002	mg/L	< 0.2	< 0.2
o-Xylene	0.001	mg/L	< 0.1	< 0.1
Xylenes - Total*	0.003	mg/L	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	97	95
Total Recoverable Hydrocarbons				
TRH C6-C9	0.02	mg/L	< 2	< 2
TRH C10-C14	0.05	mg/L	0.17	0.18
TRH C15-C28	0.1	mg/L	0.4	0.8
TRH C29-C36	0.1	mg/L	0.3	0.6
TRH C10-C36 (Total)	0.1	mg/L	0.87	1.58
Naphthalene ^{N02}	0.01	mg/L	< 1	< 1
TRH C6-C10	0.02	mg/L	< 2	< 2
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	< 2	< 2
TRH >C10-C16	0.05	mg/L	0.15	0.21
TRH >C10-C16 less Naphthalene (F2) ^{N01}	0.05	mg/L	< 1	< 1
TRH >C16-C34	0.1	mg/L	0.5	1.2
TRH >C34-C40	0.1	mg/L	0.1	0.3
TRH >C10-C40 (total)*	0.1	mg/L	0.75	1.71
Polycyclic Aromatic Hydrocarbons				
Acenaphthene	0.001	mg/L	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001
Benzo(b&j)fluoranthene ^{N07}	0.001	mg/L	< 0.001	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001
Indeno(1,2,3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001

Client Sample ID			SWMP	BATCH BUND
Sample Matrix			Trade Waste	Trade Waste
Eurofins Sample No.			M21-De08242	M21-De08243
Date Sampled			Dec 02, 2021	Dec 02, 2021
Test/Reference	LOR	Unit		
Polycyclic Aromatic Hydrocarbons				
Naphthalene	0.001	mg/L	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	67	136
p-Terphenyl-d14 (surr.)	1	%	127	107
Glycols*				
Di-Ethylene Glycol*	20	mg/L	< 20	< 20
Ethylene glycol*	20	mg/L	79	< 20
Propylene glycol*	20	mg/L	< 20	< 20
Triethylene glycol*	20	mg/L	< 20	< 20
Polychlorinated Biphenyls				
Aroclor-1016	0.005	mg/L	< 0.005	< 0.005
Aroclor-1221	0.005	mg/L	< 0.005	< 0.005
Aroclor-1232	0.005	mg/L	< 0.005	< 0.005
Aroclor-1242	0.005	mg/L	< 0.005	< 0.005
Aroclor-1248	0.005	mg/L	< 0.005	< 0.005
Aroclor-1254	0.005	mg/L	< 0.005	< 0.005
Aroclor-1260	0.005	mg/L	< 0.005	< 0.005
Total PCB*	0.005	mg/L	< 0.005	< 0.005
Dibutylchloroendate (surr.)	1	%	89	111
Tetrachloro-m-xylene (surr.)	1	%	115	113
Phenols (Halogenated)				
2-Chlorophenol	0.003	mg/L	< 0.003	< 0.003
2,4-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003
2,4,5-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01
2,4,6-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01
2,6-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01	< 0.01
Pentachlorophenol	0.01	mg/L	< 0.01	< 0.01
Tetrachlorophenols - Total	0.03	mg/L	< 0.03	< 0.03
Total Halogenated Phenol*	0.01	mg/L	< 0.01	< 0.01
Phenols (non-Halogenated)				
2-Cyclohexyl-4,6-dinitrophenol	0.1	mg/L	< 0.1	< 0.1
2-Methyl-4,6-dinitrophenol	0.03	mg/L	< 0.03	< 0.03
2-Nitrophenol	0.01	mg/L	< 0.01	< 0.01
2,4-Dimethylphenol	0.003	mg/L	< 0.003	< 0.003
2,4-Dinitrophenol	0.03	mg/L	< 0.03	< 0.03
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003	< 0.003
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006	< 0.006
Total cresols*	0.01	mg/L	< 0.01	< 0.01
4-Nitrophenol	0.03	mg/L	< 0.03	< 0.03
Dinoseb	0.1	mg/L	< 0.1	< 0.1
Phenol	0.003	mg/L	< 0.003	< 0.003
Phenol-d6 (surr.)	1	%	59	67
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1	< 0.1

Client Sample ID			SWMP	BATCH BUND
Sample Matrix			Trade Waste	Trade Waste
Eurofins Sample No.			M21-De08242	M21-De08243
Date Sampled			Dec 02, 2021	Dec 02, 2021
Test/Reference	LOR	Unit		
Ammonium Ion (as N)	0.01	mg/L	< 0.05	< 0.05
Chloride	1	mg/L	33	26
Cyanide (total)	0.01	mg/L	< 0.01	< 0.01
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.25	< 0.25
Phosphate total (as P)	0.01	mg/L	0.07	0.33
Sulphate (as SO ₄)	5	mg/L	< 5	6.4
Total Dissolved Solids Dried at 180°C ± 2°C	10	mg/L	190	250
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	2.0	1.7
Total Nitrogen (as N)*	0.2	mg/L	2	1.7
Total Suspended Solids Dried at 103–105°C	5	mg/L	31	27
Alkalinity (speciated)				
Bicarbonate Alkalinity (as CaCO ₃)	20	mg/L	180	150
Carbonate Alkalinity (as CaCO ₃)	20	mg/L	< 20	< 20
Hydroxide Alkalinity (as CaCO ₃)	20	mg/L	< 20	< 20
Total Alkalinity (as CaCO ₃)	20	mg/L	180	150
Heavy Metals				
Antimony	0.05	mg/L	< 0.05	< 0.05
Antimony (filtered)	0.005	mg/L	< 0.005	< 0.005
Arsenic	0.01	mg/L	< 0.01	< 0.01
Arsenic (filtered)	0.001	mg/L	< 0.001	0.001
Barium	0.02	mg/L	0.09	0.03
Barium (filtered)	0.02	mg/L	0.08	0.03
Beryllium	0.01	mg/L	< 0.01	< 0.01
Beryllium (filtered)	0.001	mg/L	< 0.001	< 0.001
Boron	0.05	mg/L	0.08	0.12
Boron (filtered)	0.05	mg/L	< 0.05	0.09
Cadmium	0.001	mg/L	< 0.001	< 0.001
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002
Chromium	0.01	mg/L	< 0.01	< 0.01
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001
Cobalt	0.01	mg/L	< 0.01	< 0.01
Cobalt (filtered)	0.001	mg/L	< 0.001	< 0.001
Copper	0.01	mg/L	< 0.01	0.01
Copper (filtered)	0.001	mg/L	< 0.001	0.004
Lead	0.01	mg/L	< 0.01	< 0.01
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001
Manganese	0.05	mg/L	0.15	0.08
Manganese (filtered)	0.005	mg/L	0.13	0.081
Mercury	0.001	mg/L	< 0.001	< 0.001
Mercury (filtered)	0.001	mg/L	< 0.001	< 0.001
Nickel	0.01	mg/L	< 0.01	< 0.01
Nickel (filtered)	0.001	mg/L	0.006	0.003
Selenium	0.05	mg/L	< 0.05	< 0.05
Selenium (filtered)	0.001	mg/L	< 0.001	< 0.001
Vanadium	0.05	mg/L	< 0.05	< 0.05
Vanadium (filtered)	0.005	mg/L	< 0.005	< 0.005
Zinc	0.01	mg/L	1.2	1.0
Zinc (filtered)	0.005	mg/L	1.2	0.57

Client Sample ID			SWMP	BATCH BUND
Sample Matrix			Trade Waste	Trade Waste
Eurofins Sample No.			M21-De08242	M21-De08243
Date Sampled			Dec 02, 2021	Dec 02, 2021
Test/Reference	LOR	Unit		
Alkali Metals				
Calcium	0.5	mg/L	9.2	12
Magnesium	0.5	mg/L	0.9	< 0.5
Potassium	0.5	mg/L	1.9	3.7
Sodium	0.5	mg/L	19	47
Perfluoroalkyl carboxylic acids (PFCAs)				
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	< 0.05	< 0.05
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	0.03	0.02
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	0.02	0.03
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.01	ug/L	< 0.01	< 0.01
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	< 0.01	0.01
Perfluorononanoic acid (PFNA) ^{N11}	0.01	ug/L	< 0.01	< 0.01
Perfluorodecanoic acid (PFDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01
Perfluoroundecanoic acid (PFUnDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01
Perfluorododecanoic acid (PFDoDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01
Perfluorotridecanoic acid (PFTTrDA) ^{N15}	0.01	ug/L	< 0.01	< 0.01
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01
13C4-PFBA (surr.)	1	%	112	111
13C5-PFPeA (surr.)	1	%	120	128
13C5-PFHxA (surr.)	1	%	122	115
13C4-PFHpA (surr.)	1	%	125	123
13C8-PFOA (surr.)	1	%	127	120
13C5-PFNA (surr.)	1	%	148	149
13C6-PFDA (surr.)	1	%	129	133
13C2-PFUnDA (surr.)	1	%	117	130
13C2-PFDoDA (surr.)	1	%	141	130
13C2-PFTeDA (surr.)	1	%	46	57
Perfluoroalkyl sulfonamido substances				
Perfluorooctane sulfonamide (FOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE) ^{N11}	0.05	ug/L	< 0.05	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE) ^{N11}	0.05	ug/L	< 0.05	< 0.05
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	0.05	ug/L	< 0.05	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	0.05	ug/L	< 0.05	< 0.05
13C8-FOSA (surr.)	1	%	61	67
D3-N-MeFOSA (surr.)	1	%	43	64
D5-N-EtFOSA (surr.)	1	%	38	51
D7-N-MeFOSE (surr.)	1	%	67	100
D9-N-EtFOSE (surr.)	1	%	57	71
D5-N-EtFOSAA (surr.)	1	%	122	136
D3-N-MeFOSAA (surr.)	1	%	109	113
Perfluoroalkyl sulfonic acids (PFSAs)				
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	< 0.01	0.01
Perfluorononanesulfonic acid (PFNS) ^{N15}	0.01	ug/L	< 0.01	< 0.01
Perfluoropropanesulfonic acid (PFPrS) ^{N15}	0.01	ug/L	< 0.01	< 0.01
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.01	ug/L	< 0.01	< 0.01

Client Sample ID			SWMP	BATCH BUND
Sample Matrix			Trade Waste	Trade Waste
Eurofins Sample No.			M21-De08242	M21-De08243
Date Sampled			Dec 02, 2021	Dec 02, 2021
Test/Reference	LOR	Unit		
Perfluoroalkyl sulfonic acids (PFASs)				
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	0.04	0.08
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	< 0.01	0.01
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	0.16	0.41
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 0.01	< 0.01
13C3-PFBS (surr.)	1	%	127	117
18O2-PFHxS (surr.)	1	%	99	96
13C8-PFOS (surr.)	1	%	104	98
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)				
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	< 0.01
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA) ^{N11}	0.05	ug/L	0.11	0.20
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	0.01	ug/L	0.06	0.10
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	< 0.05
13C2-4:2 FTSA (surr.)	1	%	113	176
13C2-6:2 FTSA (surr.)	1	%	94	73
13C2-8:2 FTSA (surr.)	1	%	55	88
13C2-10:2 FTSA (surr.)	1	%	105	145
PFASs Summations				
Sum (PFHxS + PFOS)*	0.01	ug/L	0.2	0.49
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	0.16	0.42
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	0.2	0.5
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	0.42	0.86
Sum of PFASs (n=30)*	0.1	ug/L	0.42	0.87

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B4A			
BTEX	Melbourne	Dec 04, 2021	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons	Melbourne	Dec 04, 2021	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Dec 04, 2021	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Dec 04, 2021	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Dec 04, 2021	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Melbourne	Dec 04, 2021	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (Halogenated)	Melbourne	Dec 04, 2021	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (non-Halogenated)	Melbourne	Dec 04, 2021	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Glycols*	Melbourne	Dec 04, 2021	7 Days
- Method: GLYCOLS- US EPA SW846 METHOD 8000 GC-FID.			
Polychlorinated Biphenyls	Melbourne	Dec 04, 2021	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8082)			
Ammonium Ion (as N)	Melbourne	Dec 04, 2021	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Cyanide (total)	Melbourne	Dec 06, 2021	14 Days
- Method: LTM-INO-4020 Total Free WAD Cyanide by CFA			
Total Suspended Solids Dried at 103–105°C	Melbourne	Dec 04, 2021	7 Days
- Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry			
Heavy Metals	Melbourne	Dec 04, 2021	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals (filtered)	Melbourne	Dec 04, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Mercury	Melbourne	Dec 04, 2021	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Mercury (filtered)	Melbourne	Dec 04, 2021	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins Suite B11C: Na/K/Ca/Mg	Melbourne	Dec 04, 2021	180 Days
- Method: LTM-MET-3010 Alkali Metals by ICP-AES			
Eurofins Suite B11E: Cl/SO4/Alkalinity			
Chloride	Melbourne	Dec 04, 2021	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
Sulphate (as SO4)	Melbourne	Dec 04, 2021	28 Days
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
Alkalinity (speciated)	Melbourne	Dec 04, 2021	14 Days
- Method: LTM-INO-4250 Alkalinity by Electrometric Titration			
Total Nitrogen Set (as N)			
Nitrate & Nitrite (as N)	Melbourne	Dec 04, 2021	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Total Kjeldahl Nitrogen (as N)	Melbourne	Dec 04, 2021	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Eurofins Suite B19A: Total N (TKN, NOx), Total P			
Phosphate total (as P)	Melbourne	Dec 04, 2021	28 Days

Description	Testing Site	Extracted	Holding Time
- Method: LTM-INO-4040 Phosphate by CFA Total Dissolved Solids Dried at 180°C ± 2°C	Melbourne	Dec 04, 2021	28 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water Per- and Polyfluoroalkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs)	Melbourne	Dec 04, 2021	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Melbourne	Dec 04, 2021	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAs)	Melbourne	Dec 04, 2021	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Melbourne	Dec 04, 2021	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
PFASs Summations	Melbourne	Dec 03, 2021	
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

Company Name:	Global Resource Recovery Pty Ltd	Order No.:		Received:	Dec 2, 2021 11:00 AM
Address:	9-11 Maria Street Laverton North VIC 3026	Report #:	846711	Due:	Dec 9, 2021
		Phone:	03 9369 4545	Priority:	5 Day
		Fax:		Contact Name:	- Rajas Patankar
Project Name:	GLOBAL RESOURCE RECOVERY				
Project ID:	PROCESSING DWN				

Eurofins Analytical Services Manager : Michael Morrison

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Internal Quality Control Review and Glossary

General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
- All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
- This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs..

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

- Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
- Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
- pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
- Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
- For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
- Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).

Authorised by:

Mary Makarios	Analytical Services Manager
Vivian Wang	Senior Analyst-Volatile (VIC)
Scott Beddoes	Senior Analyst-Inorganic (VIC)
Joseph Edouard	Senior Analyst-Organic (VIC)
Emily Rosenberg	Senior Analyst-Metal (VIC)
Joseph Edouard	Senior Analyst-PFAS (VIC)



Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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Global Resource Recovery Pty Ltd
9-11 Maria Street
Laverton North
VIC 3026



NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention: - Rajas Patankar

Report **850410-W**
Project name **GLOBAL RESOURCE RECOVERY**
Project ID **PROCESSING DWN**
Received Date **Dec 13, 2021**

Client Sample ID			SWMP
Sample Matrix			Water
Eurofins Sample No.			M21-De35974
Date Sampled			Dec 13, 2021
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons			
TRH C6-C9	0.02	mg/L	< 2
TRH C10-C14	0.05	mg/L	2.7
TRH C15-C28	0.1	mg/L	0.8
TRH C29-C36	0.1	mg/L	0.5
TRH C10-C36 (Total)	0.1	mg/L	4
Naphthalene ^{N02}	0.01	mg/L	< 1
TRH C6-C10	0.02	mg/L	< 2
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	< 2
TRH >C10-C16	0.05	mg/L	2.0
TRH >C10-C16 less Naphthalene (F2) ^{N01}	0.05	mg/L	2
TRH >C16-C34	0.1	mg/L	1.0
TRH >C34-C40	0.1	mg/L	0.2
TRH >C10-C40 (total)*	0.1	mg/L	3.2
BTEX			
Benzene	0.001	mg/L	< 0.1
Toluene	0.001	mg/L	< 0.1
Ethylbenzene	0.001	mg/L	< 0.1
m&p-Xylenes	0.002	mg/L	< 0.2
o-Xylene	0.001	mg/L	< 0.1
Xylenes - Total*	0.003	mg/L	< 0.3
4-Bromofluorobenzene (surr.)	1	%	98
Polycyclic Aromatic Hydrocarbons			
Acenaphthene	0.001	mg/L	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001
Anthracene	0.001	mg/L	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001
Benzo(b&j)fluoranthene ^{N07}	0.001	mg/L	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001
Chrysene	0.001	mg/L	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001
Fluoranthene	0.001	mg/L	< 0.001
Fluorene	0.001	mg/L	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001

Client Sample ID			SWMP
Sample Matrix			Water
Eurofins Sample No.			M21-De35974
Date Sampled			Dec 13, 2021
Test/Reference	LOR	Unit	
Polycyclic Aromatic Hydrocarbons			
Naphthalene	0.001	mg/L	< 0.001
Phenanthrene	0.001	mg/L	< 0.001
Pyrene	0.001	mg/L	< 0.001
Total PAH*	0.001	mg/L	< 0.001
2-Fluorobiphenyl (surr.)	1	%	85
p-Terphenyl-d14 (surr.)	1	%	98
Glycols*			
Di-Ethylene Glycol*	20	mg/L	< 20
Ethylene glycol*	20	mg/L	1400
Propylene glycol*	20	mg/L	< 20
Triethylene glycol*	20	mg/L	< 20
Polychlorinated Biphenyls			
Aroclor-1016	0.005	mg/L	< 0.005
Aroclor-1221	0.005	mg/L	< 0.005
Aroclor-1232	0.005	mg/L	< 0.005
Aroclor-1242	0.005	mg/L	< 0.005
Aroclor-1248	0.005	mg/L	< 0.005
Aroclor-1254	0.005	mg/L	< 0.005
Aroclor-1260	0.005	mg/L	< 0.005
Total PCB*	0.005	mg/L	< 0.005
Dibutylchloroendate (surr.)	1	%	54
Tetrachloro-m-xylene (surr.)	1	%	61
Phenols (Halogenated)			
2-Chlorophenol	0.003	mg/L	< 0.003
2,4-Dichlorophenol	0.003	mg/L	< 0.003
2,4,5-Trichlorophenol	0.01	mg/L	< 0.01
2,4,6-Trichlorophenol	0.01	mg/L	< 0.01
2,6-Dichlorophenol	0.003	mg/L	< 0.003
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01
Pentachlorophenol	0.01	mg/L	< 0.01
Tetrachlorophenols - Total	0.03	mg/L	< 0.03
Total Halogenated Phenol*	0.01	mg/L	< 0.01
Phenols (non-Halogenated)			
2-Cyclohexyl-4,6-dinitrophenol	0.1	mg/L	< 0.1
2-Methyl-4,6-dinitrophenol	0.03	mg/L	< 0.03
2-Nitrophenol	0.01	mg/L	< 0.01
2,4-Dimethylphenol	0.003	mg/L	0.19
2,4-Dinitrophenol	0.03	mg/L	< 0.03
2-Methylphenol (o-Cresol)	0.003	mg/L	0.24
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	0.47
Total cresols*	0.01	mg/L	0.71
4-Nitrophenol	0.03	mg/L	< 0.03
Dinoseb	0.1	mg/L	< 0.1
Phenol	0.003	mg/L	0.46
Phenol-d6 (surr.)	1	%	62
Total Non-Halogenated Phenol*	0.1	mg/L	2.07

Client Sample ID			SWMP
Sample Matrix			Water
Eurofins Sample No.			M21-De35974
Date Sampled			Dec 13, 2021
Test/Reference	LOR	Unit	
Ammonium Ion (as N)	0.01	mg/L	0.05
Chloride	1	mg/L	41
Cyanide (total)	0.005	mg/L	< 0.005
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05
Phosphate total (as P)	0.01	mg/L	0.25
Sulphate (as SO ₄)	5	mg/L	< 5
Total Dissolved Solids Dried at 180°C ± 2°C	10	mg/L	450
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	0.4
Total Nitrogen (as N)*	0.2	mg/L	0.4
Total Suspended Solids Dried at 103–105°C	5	mg/L	9.1
Alkalinity (speciated)			
Bicarbonate Alkalinity (as CaCO ₃)	20	mg/L	< 20
Carbonate Alkalinity (as CaCO ₃)	10	mg/L	< 10
Hydroxide Alkalinity (as CaCO ₃)	20	mg/L	< 20
Total Alkalinity (as CaCO ₃)	20	mg/L	< 20
Heavy Metals			
Antimony	0.005	mg/L	< 0.005
Antimony (filtered)	0.005	mg/L	< 0.005
Arsenic	0.001	mg/L	0.006
Arsenic (filtered)	0.001	mg/L	0.004
Barium	0.02	mg/L	0.28
Barium (filtered)	0.02	mg/L	0.32
Beryllium	0.001	mg/L	< 0.001
Beryllium (filtered)	0.001	mg/L	< 0.001
Boron	0.05	mg/L	< 0.5
Boron (filtered)	0.05	mg/L	0.42
Cadmium	0.0002	mg/L	< 0.0002
Cadmium (filtered)	0.0002	mg/L	< 0.0002
Chromium	0.001	mg/L	0.001
Chromium (filtered)	0.001	mg/L	< 0.001
Cobalt	0.001	mg/L	0.003
Cobalt (filtered)	0.001	mg/L	0.003
Copper	0.001	mg/L	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001
Lead	0.001	mg/L	0.001
Lead (filtered)	0.001	mg/L	< 0.001
Manganese	0.005	mg/L	0.44
Manganese (filtered)	0.005	mg/L	0.49
Mercury	0.0001	mg/L	< 0.0001
Mercury (filtered)	0.0001	mg/L	< 0.0001
Nickel	0.001	mg/L	0.011
Nickel (filtered)	0.001	mg/L	0.012
Selenium	0.001	mg/L	0.002
Selenium (filtered)	0.001	mg/L	0.002
Vanadium	0.005	mg/L	< 0.005
Vanadium (filtered)	0.005	mg/L	< 0.005
Zinc	0.005	mg/L	7.0
Zinc (filtered)	0.005	mg/L	6.2

Client Sample ID			SWMP
Sample Matrix			Water
Eurofins Sample No.			M21-De35974
Date Sampled			Dec 13, 2021
Test/Reference	LOR	Unit	
Alkali Metals			
Calcium	0.5	mg/L	31
Magnesium	0.5	mg/L	0.7
Potassium	0.5	mg/L	3.6
Sodium	0.5	mg/L	44
Perfluoroalkyl carboxylic acids (PFCAs)			
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	0.06
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	^{N09} 0.03
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	^{N09} 0.03
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.01	ug/L	< 0.01
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	< 0.01
Perfluorononanoic acid (PFNA) ^{N11}	0.01	ug/L	< 0.01
Perfluorodecanoic acid (PFDA) ^{N11}	0.01	ug/L	< 0.01
Perfluoroundecanoic acid (PFUnDA) ^{N11}	0.01	ug/L	< 0.01
Perfluorododecanoic acid (PFDoDA) ^{N11}	0.01	ug/L	< 0.01
Perfluorotridecanoic acid (PFTeDA) ^{N15}	0.01	ug/L	< 0.01
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	0.01	ug/L	< 0.01
13C4-PFBA (surr.)	1	%	104
13C5-PFPeA (surr.)	1	%	112
13C5-PFHxA (surr.)	1	%	111
13C4-PFHpA (surr.)	1	%	115
13C8-PFOA (surr.)	1	%	121
13C5-PFNA (surr.)	1	%	112
13C6-PFDA (surr.)	1	%	118
13C2-PFUnDA (surr.)	1	%	129
13C2-PFDoDA (surr.)	1	%	107
13C2-PFTeDA (surr.)	1	%	73
Perfluoroalkyl sulfonamido substances			
Perfluorooctane sulfonamide (FOSA) ^{N11}	0.05	ug/L	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	0.05	ug/L	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	0.05	ug/L	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE) ^{N11}	0.05	ug/L	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE) ^{N11}	0.05	ug/L	< 0.05
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	0.05	ug/L	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	0.05	ug/L	< 0.05
13C8-FOSA (surr.)	1	%	82
D3-N-MeFOSA (surr.)	1	%	120
D5-N-EtFOSA (surr.)	1	%	115
D7-N-MeFOSE (surr.)	1	%	85
D9-N-EtFOSE (surr.)	1	%	83
D5-N-EtFOSAA (surr.)	1	%	149
D3-N-MeFOSAA (surr.)	1	%	172
Perfluoroalkyl sulfonic acids (PFSAs)			
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	0.01
Perfluorononanesulfonic acid (PFNS) ^{N15}	0.01	ug/L	< 0.01
Perfluoropropanesulfonic acid (PFPrS) ^{N15}	0.01	ug/L	< 0.01
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.01	ug/L	^{N09} 0.01

Client Sample ID			SWMP
Sample Matrix			Water
Eurofins Sample No.			M21-De35974
Date Sampled			Dec 13, 2021
Test/Reference	LOR	Unit	
Perfluoroalkyl sulfonic acids (PFASs)			
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	^{N09} 0.06
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	< 0.01
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	^{N09} 0.13
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 0.01
13C3-PFBS (surr.)	1	%	100
18O2-PFHxS (surr.)	1	%	101
13C8-PFOS (surr.)	1	%	76
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	0.01	ug/L	< 0.01
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA) ^{N11}	0.05	ug/L	0.11
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	0.01	ug/L	0.04
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	0.01	ug/L	< 0.01
13C2-4:2 FTSA (surr.)	1	%	93
13C2-6:2 FTSA (surr.)	1	%	106
13C2-8:2 FTSA (surr.)	1	%	150
13C2-10:2 FTSA (surr.)	1	%	145
PFASs Summations			
Sum (PFHxS + PFOS)*	0.01	ug/L	0.19
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	0.13
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	0.19
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	0.47
Sum of PFASs (n=30)*	0.1	ug/L	0.48

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B4A			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Dec 16, 2021	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Dec 16, 2021	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Dec 16, 2021	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	Dec 16, 2021	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Melbourne	Dec 16, 2021	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (Halogenated)	Melbourne	Dec 16, 2021	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (non-Halogenated)	Melbourne	Dec 16, 2021	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Glycols*	Melbourne	Dec 16, 2021	7 Days
- Method: GLYCOLS- US EPA SW846 METHOD 8000 GC-FID.			
Polychlorinated Biphenyls	Melbourne	Dec 16, 2021	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8082)			
Ammonium Ion (as N)	Melbourne	Dec 16, 2021	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Cyanide (total)	Melbourne	Dec 16, 2021	14 Days
- Method: LTM-INO-4020 Total Free WAD Cyanide by CFA			
Total Suspended Solids Dried at 103–105°C	Melbourne	Dec 16, 2021	7 Days
- Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry			
Heavy Metals	Melbourne	Dec 16, 2021	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals (filtered)	Melbourne	Dec 16, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Mobil Metals : Metals M15	Melbourne	Dec 16, 2021	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins Suite B11C: Na/K/Ca/Mg	Melbourne	Dec 16, 2021	180 Days
- Method: LTM-MET-3010 Alkali Metals by ICP-AES			
Eurofins Suite B11E: Cl/SO4/Alkalinity			
Chloride	Melbourne	Dec 16, 2021	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
Sulphate (as SO4)	Melbourne	Dec 16, 2021	28 Days
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
Alkalinity (speciated)	Melbourne	Dec 16, 2021	14 Days
- Method: LTM-INO-4250 Alkalinity by Electrometric Titration			
Total Nitrogen Set (as N)			
Nitrate & Nitrite (as N)	Melbourne	Dec 16, 2021	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Total Kjeldahl Nitrogen (as N)	Melbourne	Dec 16, 2021	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Eurofins Suite B19A: Total N (TKN, NOx), Total P			
Phosphate total (as P)	Melbourne	Dec 16, 2021	28 Days
- Method: LTM-INO-4040 Phosphate by CFA			
Total Dissolved Solids Dried at 180°C ± 2°C	Melbourne	Dec 16, 2021	28 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			
Per- and Polyfluoroalkyl Substances (PFASs)			

Description	Testing Site	Extracted	Holding Time
Perfluoroalkyl carboxylic acids (PFCAs) - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Dec 16, 2021	28 Days
Perfluoroalkyl sulfonamido substances - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Dec 16, 2021	28 Days
Perfluoroalkyl sulfonic acids (PFSAs) - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Dec 16, 2021	28 Days
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs) - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Dec 16, 2021	28 Days
PFASs Summations - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Dec 15, 2021	

Company Name:	Global Resource Recovery Pty Ltd	Order No.:	GRR DARWIN	Received:	Dec 13, 2021 3:05 PM
Address:	9-11 Maria Street Laverton North VIC 3026	Report #:	850410	Due:	Dec 29, 2021
Project Name:	GLOBAL RESOURCE RECOVERY	Phone:	03 9369 4545	Priority:	10 Day
Project ID:	PROCESSING DWN	Fax:		Contact Name:	- Rajas Patankar

Eurofins Analytical Services Manager : Michael Morrison

Sample Detail						Total Dissolved Solids Dried at 180°C ± 2°C																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
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Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	µg/L: micrograms per litre
ppm: parts per million	ppb: parts per billion	%: Percentage
org/100mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.4
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Comments

Quality Control Results were not displayed on the request of the client

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
N09	Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).
Q02	The duplicate %RPD is outside the recommended acceptance criteria. Further analysis indicates sample heterogeneity as the cause

Authorised by:

Harry Bacalis	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal (VIC)
Joseph Edouard	Senior Analyst-Organic (VIC)
Joseph Edouard	Senior Analyst-PFAS (VIC)
Scott Beddoes	Senior Analyst-Inorganic (VIC)
Vivian Wang	Senior Analyst-Volatile (VIC)



Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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Global Resource Recovery Pty Ltd
9-11 Maria Street
Laverton North
VIC 3026



NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention: Sue McWirther

Report 855435-W
Project name GLOBAL RESOURCE RECOVERY
Project ID PROCESSING DWN
Received Date Jan 13, 2022

Client Sample ID			SWMP
Sample Matrix			Water
Eurofins Sample No.			M22-Ja10591
Date Sampled			Jan 12, 2022
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons			
TRH C6-C9	0.02	mg/L	< 0.1
TRH C10-C14	0.05	mg/L	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1
Naphthalene ^{N02}	0.01	mg/L	< 0.05
TRH C6-C10	0.02	mg/L	< 0.1
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	< 0.1
TRH >C10-C16	0.05	mg/L	< 0.05
TRH >C10-C16 less Naphthalene (F2) ^{N01}	0.05	mg/L	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1
BTEX			
Benzene	0.001	mg/L	< 0.005
Toluene	0.001	mg/L	< 0.005
Ethylbenzene	0.001	mg/L	< 0.005
m&p-Xylenes	0.002	mg/L	< 0.01
o-Xylene	0.001	mg/L	< 0.005
Xylenes - Total*	0.003	mg/L	< 0.015
4-Bromofluorobenzene (surr.)	1	%	116
Glycols*			
Di-Ethylene Glycol*	20	mg/L	< 20
Ethylene glycol*	20	mg/L	28
Propylene glycol*	20	mg/L	< 20
Triethylene glycol*	20	mg/L	< 20
Polychlorinated Biphenyls			
Aroclor-1016	0.005	mg/L	< 0.005
Aroclor-1221	0.005	mg/L	< 0.005
Aroclor-1232	0.005	mg/L	< 0.005
Aroclor-1242	0.005	mg/L	< 0.005
Aroclor-1248	0.005	mg/L	< 0.005
Aroclor-1254	0.005	mg/L	< 0.005
Aroclor-1260	0.005	mg/L	< 0.005
Total PCB*	0.005	mg/L	< 0.005

Client Sample ID			SWMP
Sample Matrix			Water
Eurofins Sample No.			M22-Ja10591
Date Sampled			Jan 12, 2022
Test/Reference	LOR	Unit	
Polychlorinated Biphenyls			
Dibutylchlorendate (surr.)	1	%	70
Tetrachloro-m-xylene (surr.)	1	%	96
Ammonium Ion (as N)	0.01	mg/L	0.26
Chloride	1	mg/L	66
Chromium (hexavalent)	0.005	mg/L	< 0.005
Cyanide (total)	0.005	mg/L	< 0.005
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.25
Phosphate total (as P)	0.01	mg/L	0.28
Sulphate (as SO ₄)	5	mg/L	< 5
Total Dissolved Solids Dried at 180°C ± 2°C	10	mg/L	420
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	2.2
Total Nitrogen (as N)*	0.2	mg/L	2.2
Total Suspended Solids Dried at 103°C–105°C	5	mg/L	20
Alkalinity (speciated)			
Bicarbonate Alkalinity (as CaCO ₃)	20	mg/L	41
Carbonate Alkalinity (as CaCO ₃)	10	mg/L	< 10
Hydroxide Alkalinity (as CaCO ₃)	20	mg/L	< 20
Total Alkalinity (as CaCO ₃)	20	mg/L	41
Heavy Metals			
Antimony	0.005	mg/L	< 0.005
Antimony (filtered)	0.005	mg/L	< 0.005
Arsenic	0.001	mg/L	0.010
Arsenic (filtered)	0.001	mg/L	0.004
Barium	0.02	mg/L	0.39
Barium (filtered)	0.02	mg/L	0.32
Beryllium	0.001	mg/L	< 0.001
Beryllium (filtered)	0.001	mg/L	< 0.001
Boron	0.05	mg/L	0.14
Boron (filtered)	0.05	mg/L	0.09
Cadmium	0.0002	mg/L	< 0.0002
Cadmium (filtered)	0.0002	mg/L	< 0.0002
Chromium	0.001	mg/L	0.001
Chromium (filtered)	0.001	mg/L	< 0.001
Cobalt	0.001	mg/L	0.005
Copper	0.001	mg/L	0.005
Copper (filtered)	0.001	mg/L	< 0.001
Lead	0.001	mg/L	0.002
Lead (filtered)	0.001	mg/L	< 0.001
Manganese	0.005	mg/L	0.67
Manganese (filtered)	0.005	mg/L	0.64
Mercury	0.0001	mg/L	< 0.0001
Mercury (filtered)	0.0001	mg/L	< 0.0001
Nickel	0.001	mg/L	0.013
Nickel (filtered)	0.001	mg/L	0.013
Selenium	0.001	mg/L	0.015
Selenium (filtered)	0.001	mg/L	< 0.001
Vanadium	0.005	mg/L	< 0.005
Vanadium (filtered)	0.005	mg/L	< 0.005

Client Sample ID			SWMP
Sample Matrix			Water
Eurofins Sample No.			M22-Ja10591
Date Sampled			Jan 12, 2022
Test/Reference	LOR	Unit	
Heavy Metals			
Zinc	0.005	mg/L	5.2
Zinc (filtered)	0.005	mg/L	4.9
Alkali Metals			
Calcium	0.5	mg/L	27
Magnesium	0.5	mg/L	< 5
Potassium	0.5	mg/L	< 5
Sodium	0.5	mg/L	63
Perfluoroalkyl carboxylic acids (PFCAs)			
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	< 0.05
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	0.06
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	^{N09} 0.03
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.01	ug/L	^{N09} 0.01
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	< 0.01
Perfluorononanoic acid (PFNA) ^{N11}	0.01	ug/L	< 0.01
Perfluorodecanoic acid (PFDA) ^{N11}	0.01	ug/L	< 0.01
Perfluoroundecanoic acid (PFUnDA) ^{N11}	0.01	ug/L	< 0.01
Perfluorododecanoic acid (PFDoDA) ^{N11}	0.01	ug/L	< 0.01
Perfluorotridecanoic acid (PFTeDA) ^{N15}	0.01	ug/L	< 0.01
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	0.01	ug/L	< 0.01
13C4-PFBA (surr.)	1	%	100
13C5-PFPeA (surr.)	1	%	110
13C5-PFHxA (surr.)	1	%	88
13C4-PFHpA (surr.)	1	%	90
13C8-PFOA (surr.)	1	%	82
13C5-PFNA (surr.)	1	%	83
13C6-PFDA (surr.)	1	%	96
13C2-PFUnDA (surr.)	1	%	123
13C2-PFDoDA (surr.)	1	%	33
13C2-PFTeDA (surr.)	1	%	25
Perfluoroalkyl sulfonamido substances			
Perfluorooctane sulfonamide (FOSA) ^{N11}	0.05	ug/L	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	0.05	ug/L	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	0.05	ug/L	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE) ^{N11}	0.05	ug/L	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE) ^{N11}	0.05	ug/L	< 0.05
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	0.05	ug/L	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	0.05	ug/L	< 0.05
13C8-FOSA (surr.)	1	%	89
D3-N-MeFOSA (surr.)	1	%	98
D5-N-EtFOSA (surr.)	1	%	94
D7-N-MeFOSE (surr.)	1	%	79
D9-N-EtFOSE (surr.)	1	%	76
D5-N-EtFOSAA (surr.)	1	%	45
D3-N-MeFOSAA (surr.)	1	%	39

Client Sample ID			SWMP
Sample Matrix			Water
Eurofins Sample No.			M22-Ja10591
Date Sampled			Jan 12, 2022
Test/Reference	LOR	Unit	
Perfluoroalkyl sulfonic acids (PFASs)			
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	< 0.01
Perfluorononanesulfonic acid (PFNS) ^{N15}	0.01	ug/L	< 0.01
Perfluoropropanesulfonic acid (PFPrS) ^{N15}	0.01	ug/L	< 0.01
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.01	ug/L	< 0.01
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	< 0.01
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	< 0.01
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	^{N09} 0.11
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 0.01
13C3-PFBS (surr.)	1	%	85
18O2-PFHxS (surr.)	1	%	77
13C8-PFOS (surr.)	1	%	81
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	0.01	ug/L	< 0.01
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA) ^{N11}	0.05	ug/L	0.11
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	0.01	ug/L	< 0.01
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	0.01	ug/L	< 0.01
13C2-4:2 FTSA (surr.)	1	%	181
13C2-6:2 FTSA (surr.)	1	%	119
13C2-8:2 FTSA (surr.)	1	%	146
13C2-10:2 FTSA (surr.)	1	%	20
PFASs Summations			
Sum (PFHxS + PFOS)*	0.01	ug/L	0.11
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	0.11
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	0.11
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	0.32
Sum of PFASs (n=30)*	0.1	ug/L	0.32

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B6A			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Jan 15, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Jan 15, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Jan 15, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	Jan 15, 2022	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Chromium (hexavalent)	Melbourne	Jan 15, 2022	28 Days
- Method: LTM-INO-4100 Analysis of Cr6+ by Discrete Analyser			
NEPM 2013 Metals : Metals M12	Melbourne	Jan 15, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Glycols*	Melbourne	Jan 15, 2022	7 Days
- Method: GLYCOLS- US EPA SW846 METHOD 8000 GC-FID.			
Polychlorinated Biphenyls	Melbourne	Jan 15, 2022	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8082)			
Ammonium Ion (as N)	Melbourne	Jan 15, 2022	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Cyanide (total)	Melbourne	Jan 15, 2022	14 Days
- Method: LTM-INO-4020 Total Free WAD Cyanide by CFA			
Total Suspended Solids Dried at 103°C–105°C	Melbourne	Jan 15, 2022	7 Days
- Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry			
Heavy Metals	Melbourne	Jan 15, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals (filtered)	Melbourne	Jan 15, 2022	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Mobil Metals : Metals M15	Melbourne	Jan 15, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins Suite B11C: Na/K/Ca/Mg	Melbourne	Jan 15, 2022	180 Days
- Method: LTM-MET-3010 Alkali Metals by ICP-AES			
Eurofins Suite B11E: Cl/SO4/Alkalinity			
Chloride	Melbourne	Jan 15, 2022	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
Sulphate (as SO4)	Melbourne	Jan 15, 2022	28 Days
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
Alkalinity (speciated)	Melbourne	Jan 15, 2022	14 Days
- Method: LTM-INO-4250 Alkalinity by Electrometric Titration			
Total Nitrogen Set (as N)			
Nitrate & Nitrite (as N)	Melbourne	Jan 15, 2022	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Total Kjeldahl Nitrogen (as N)	Melbourne	Jan 15, 2022	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Eurofins Suite B19A: Total N (TKN, NOx), Total P			
Phosphate total (as P)	Melbourne	Jan 15, 2022	28 Days
- Method: LTM-INO-4040 Phosphate by CFA			
Total Dissolved Solids Dried at 180°C ± 2°C	Melbourne	Jan 15, 2022	28 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			
Per- and Polyfluoroalkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs)	Melbourne	Jan 15, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

Description	Testing Site	Extracted	Holding Time
Perfluoroalkyl sulfonamido substances - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Jan 15, 2022	28 Days
Perfluoroalkyl sulfonic acids (PFASs) - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Jan 15, 2022	28 Days
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs) - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Jan 15, 2022	28 Days
PFASs Summations - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Jan 14, 2022	

Company Name: Global Resource Recovery Pty Ltd
Address: 9-11 Maria Street
Laverton North
VIC 3026

Project Name: GLOBAL RESOURCE RECOVERY
Project ID: PROCESSING DWN

Order No.:
Report #: 855435
Phone: 03 9369 4545
Fax:

Received: Jan 13, 2022 9:40 AM
Due: Jan 20, 2022
Priority: 5 Day
Contact Name: Sue McWirther

Eurofins Analytical Services Manager : Michael Morrison

Sample Detail						Total Dissolved Solids Dried at 180°C ± 2°C																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	µg/L: micrograms per litre
ppm: parts per million	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Comments

Quality Control Results were not displayed on the request of the client

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N09	Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).

Authorised by:

Michael Morrison	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal (VIC)
Joseph Edouard	Senior Analyst-Organic (VIC)
Joseph Edouard	Senior Analyst-PFAS (VIC)
Scott Beddoes	Senior Analyst-Inorganic (VIC)
Vivian Wang	Senior Analyst-Volatile (VIC)



Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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Global Resource Recovery Pty Ltd
9-11 Maria Street
Laverton North
VIC 3026



NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention: **Darwin Operation**

Report **862017-W**
Project name **GLOBAL RESOURCE RECOVERY**
Project ID **PROCESSING DWN**
Received Date **Feb 10, 2022**

Client Sample ID			SWMP
Sample Matrix			Water
Eurofins Sample No.			M22-Fe17465
Date Sampled			Feb 09, 2022
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons			
TRH C6-C9	0.02	mg/L	< 2
TRH C10-C14	0.05	mg/L	0.24
TRH C15-C28	0.1	mg/L	0.5
TRH C29-C36	0.1	mg/L	0.3
TRH C10-C36 (Total)	0.1	mg/L	1.04
Naphthalene ^{N02}	0.01	mg/L	< 1
TRH C6-C10	0.02	mg/L	< 2
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	< 2
TRH >C10-C16	0.05	mg/L	0.24
TRH >C10-C16 less Naphthalene (F2) ^{N01}	0.05	mg/L	< 1
TRH >C16-C34	0.1	mg/L	0.6
TRH >C34-C40	0.1	mg/L	0.1
TRH >C10-C40 (total)*	0.1	mg/L	0.94
BTEX			
Benzene	0.001	mg/L	< 0.1
Toluene	0.001	mg/L	< 0.1
Ethylbenzene	0.001	mg/L	< 0.1
m&p-Xylenes	0.002	mg/L	< 0.2
o-Xylene	0.001	mg/L	< 0.1
Xylenes - Total*	0.003	mg/L	< 0.3
4-Bromofluorobenzene (surr.)	1	%	103
Polycyclic Aromatic Hydrocarbons			
Acenaphthene	0.001	mg/L	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001
Anthracene	0.001	mg/L	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001
Benzo(b&j)fluoranthene ^{N07}	0.001	mg/L	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001
Chrysene	0.001	mg/L	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001
Fluoranthene	0.001	mg/L	< 0.001
Fluorene	0.001	mg/L	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001

Client Sample ID			SWMP
Sample Matrix			Water
Eurofins Sample No.			M22-Fe17465
Date Sampled			Feb 09, 2022
Test/Reference	LOR	Unit	
Polycyclic Aromatic Hydrocarbons			
Naphthalene	0.001	mg/L	< 0.001
Phenanthrene	0.001	mg/L	< 0.001
Pyrene	0.001	mg/L	< 0.001
Total PAH*	0.001	mg/L	< 0.001
2-Fluorobiphenyl (surr.)	1	%	112
p-Terphenyl-d14 (surr.)	1	%	67
Glycols*			
Di-Ethylene Glycol*	20	mg/L	< 20
Ethylene glycol*	20	mg/L	38
Propylene glycol*	20	mg/L	37
Triethylene glycol*	20	mg/L	< 20
Polychlorinated Biphenyls			
Aroclor-1016	0.005	mg/L	< 0.005
Aroclor-1221	0.005	mg/L	< 0.005
Aroclor-1232	0.005	mg/L	< 0.005
Aroclor-1242	0.005	mg/L	< 0.005
Aroclor-1248	0.005	mg/L	< 0.005
Aroclor-1254	0.005	mg/L	< 0.005
Aroclor-1260	0.005	mg/L	< 0.005
Total PCB*	0.005	mg/L	0
Dibutylchloroendate (surr.)	1	%	89
Tetrachloro-m-xylene (surr.)	1	%	72
Phenols (Halogenated)			
2-Chlorophenol	0.003	mg/L	< 0.003
2,4-Dichlorophenol	0.003	mg/L	< 0.003
2,4,5-Trichlorophenol	0.01	mg/L	< 0.01
2,4,6-Trichlorophenol	0.01	mg/L	< 0.01
2,6-Dichlorophenol	0.003	mg/L	< 0.003
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01
Pentachlorophenol	0.01	mg/L	< 0.01
Tetrachlorophenols - Total	0.03	mg/L	< 0.03
Total Halogenated Phenol*	0.01	mg/L	< 0.01
Phenols (non-Halogenated)			
2-Cyclohexyl-4,6-dinitrophenol	0.1	mg/L	< 0.1
2-Methyl-4,6-dinitrophenol	0.03	mg/L	< 0.03
2-Nitrophenol	0.01	mg/L	< 0.01
2,4-Dimethylphenol	0.003	mg/L	< 0.003
2,4-Dinitrophenol	0.03	mg/L	< 0.03
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006
Total cresols*	0.01	mg/L	< 0.01
4-Nitrophenol	0.03	mg/L	< 0.03
Dinoseb	0.1	mg/L	< 0.1
Phenol	0.003	mg/L	0.004
Phenol-d6 (surr.)	1	%	93
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1

Client Sample ID			SWMP
Sample Matrix			Water
Eurofins Sample No.			M22-Fe17465
Date Sampled			Feb 09, 2022
Test/Reference	LOR	Unit	
Ammonia (as N)	0.01	mg/L	1.2
Chloride	1	mg/L	57
Cyanide (total)	0.005	mg/L	< 0.005
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05
Phosphate total (as P)	0.01	mg/L	< 0.1
Sulphate (as SO ₄)	5	mg/L	< 5
Total Dissolved Solids Dried at 180°C ± 2°C	10	mg/L	300
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	1.7
Total Nitrogen (as N)*	0.2	mg/L	1.7
Total Suspended Solids Dried at 103°C–105°C	5	mg/L	28
Alkalinity (speciated)			
Bicarbonate Alkalinity (as CaCO ₃)	20	mg/L	110
Carbonate Alkalinity (as CaCO ₃)	10	mg/L	< 10
Hydroxide Alkalinity (as CaCO ₃)	20	mg/L	< 20
Total Alkalinity (as CaCO ₃)	20	mg/L	110
Heavy Metals			
Antimony	0.005	mg/L	< 0.005
Antimony (filtered)	0.005	mg/L	< 0.005
Arsenic	0.001	mg/L	0.003
Arsenic (filtered)	0.001	mg/L	0.002
Barium	0.02	mg/L	0.36
Barium (filtered)	0.02	mg/L	0.35
Beryllium	0.001	mg/L	< 0.001
Beryllium (filtered)	0.001	mg/L	< 0.001
Cadmium	0.0002	mg/L	< 0.0002
Cadmium (filtered)	0.0002	mg/L	< 0.0002
Chromium	0.001	mg/L	< 0.001
Chromium (filtered)	0.001	mg/L	< 0.001
Copper	0.001	mg/L	0.002
Copper (filtered)	0.001	mg/L	< 0.001
Lead	0.001	mg/L	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001
Manganese	0.005	mg/L	0.51
Manganese (filtered)	0.005	mg/L	0.51
Mercury	0.0001	mg/L	< 0.0001
Mercury (filtered)	0.0001	mg/L	< 0.0001
Nickel	0.001	mg/L	0.010
Nickel (filtered)	0.001	mg/L	0.010
Selenium	0.001	mg/L	< 0.001
Selenium (filtered)	0.001	mg/L	< 0.001
Vanadium	0.005	mg/L	< 0.005
Vanadium (filtered)	0.005	mg/L	< 0.005
Zinc	0.005	mg/L	0.87
Zinc (filtered)	0.005	mg/L	0.53
Alkali Metals			
Calcium	0.5	mg/L	14
Magnesium	0.5	mg/L	1.2
Potassium	0.5	mg/L	5.3
Sodium	0.5	mg/L	57

Client Sample ID			SWMP
Sample Matrix			Water
Eurofins Sample No.			M22-Fe17465
Date Sampled			Feb 09, 2022
Test/Reference	LOR	Unit	
Perfluoroalkyl carboxylic acids (PFCAs)			
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	< 0.05
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	0.20
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	0.21
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.01	ug/L	^{N09} 0.11
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	^{N09} 0.09
Perfluorononanoic acid (PFNA) ^{N11}	0.01	ug/L	^{N09} 0.01
Perfluorodecanoic acid (PFDA) ^{N11}	0.01	ug/L	< 0.01
Perfluoroundecanoic acid (PFUnDA) ^{N11}	0.01	ug/L	< 0.01
Perfluorododecanoic acid (PFDoDA) ^{N11}	0.01	ug/L	< 0.01
Perfluorotridecanoic acid (PFTriDA) ^{N15}	0.01	ug/L	< 0.01
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	0.01	ug/L	< 0.01
13C4-PFBA (surr.)	1	%	73
13C5-PFPeA (surr.)	1	%	98
13C5-PFHxA (surr.)	1	%	103
13C4-PFHpA (surr.)	1	%	108
13C8-PFOA (surr.)	1	%	107
13C5-PFNA (surr.)	1	%	104
13C6-PFDA (surr.)	1	%	101
13C2-PFUnDA (surr.)	1	%	93
13C2-PFDoDA (surr.)	1	%	81
13C2-PFTeDA (surr.)	1	%	43
Perfluoroalkyl sulfonamido substances			
Perfluorooctane sulfonamide (FOSA) ^{N11}	0.05	ug/L	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	0.05	ug/L	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	0.05	ug/L	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE) ^{N11}	0.05	ug/L	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE) ^{N11}	0.05	ug/L	< 0.05
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	0.05	ug/L	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	0.05	ug/L	< 0.05
13C8-FOSA (surr.)	1	%	78
D3-N-MeFOSA (surr.)	1	%	14
D5-N-EtFOSA (surr.)	1	%	11
D7-N-MeFOSE (surr.)	1	%	43
D9-N-EtFOSE (surr.)	1	%	
D5-N-EtFOSAA (surr.)	1	%	46
D3-N-MeFOSAA (surr.)	1	%	43
Perfluoroalkyl sulfonic acids (PFSAs)			
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	< 0.01
Perfluorononanesulfonic acid (PFNS) ^{N15}	0.01	ug/L	< 0.01
Perfluoropropanesulfonic acid (PFPrS) ^{N15}	0.01	ug/L	< 0.01
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.01	ug/L	< 0.01
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	^{N09} 0.05
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	< 0.01
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	^{N09} 0.22
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 0.01
13C3-PFBS (surr.)	1	%	89

Client Sample ID			SWMP
Sample Matrix			Water
Eurofins Sample No.			M22-Fe17465
Date Sampled			Feb 09, 2022
Test/Reference	LOR	Unit	
Perfluoroalkyl sulfonic acids (PFSA)			
18O2-PFHxS (surr.)	1	%	75
13C8-PFOS (surr.)	1	%	81
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	0.01	ug/L	< 0.01
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA) ^{N11}	0.05	ug/L	0.90
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	0.01	ug/L	0.31
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	0.01	ug/L	< 0.01
13C2-4:2 FTSA (surr.)	1	%	196
13C2-6:2 FTSA (surr.)	1	%	126
13C2-8:2 FTSA (surr.)	1	%	119
13C2-10:2 FTSA (surr.)	1	%	102
PFASs Summations			
Sum (PFHxS + PFOS)*	0.01	ug/L	0.27
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	0.31
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	0.36
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	2.09
Sum of PFASs (n=30)*	0.1	ug/L	2.1

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B4A			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Feb 11, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Feb 11, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Feb 11, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	Feb 11, 2022	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
Polycyclic Aromatic Hydrocarbons	Melbourne	Feb 11, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (Halogenated)	Melbourne	Feb 11, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (non-Halogenated)	Melbourne	Feb 11, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Glycols*	Melbourne	Feb 11, 2022	7 Days
- Method: GLYCOLS- US EPA SW846 METHOD 8000 GC-FID.			
Polychlorinated Biphenyls	Melbourne	Feb 11, 2022	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8082)			
Ammonia (as N)	Melbourne	Feb 11, 2022	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Cyanide (total)	Melbourne	Feb 14, 2022	14 Days
- Method: LTM-INO-4020 Total Free WAD Cyanide by CFA			
Total Suspended Solids Dried at 103°C–105°C	Melbourne	Feb 11, 2022	7 Days
- Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry			
Heavy Metals	Melbourne	Feb 11, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals (filtered)	Melbourne	Feb 11, 2022	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Mobil Metals : Metals M15	Melbourne	Feb 11, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins Suite B11C: Na/K/Ca/Mg	Melbourne	Feb 11, 2022	180 Days
- Method: LTM-MET-3010 Alkali Metals by ICP-AES			
Eurofins Suite B11E: Cl/SO4/Alkalinity			
Chloride	Melbourne	Feb 11, 2022	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
Sulphate (as SO4)	Melbourne	Feb 11, 2022	28 Days
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
Alkalinity (speciated)	Melbourne	Feb 11, 2022	14 Days
- Method: LTM-INO-4250 Alkalinity by Electrometric Titration			
Total Nitrogen Set (as N)			
Nitrate & Nitrite (as N)	Melbourne	Feb 11, 2022	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Total Kjeldahl Nitrogen (as N)	Melbourne	Feb 11, 2022	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Eurofins Suite B19A: Total N (TKN, NOx), Total P			
Phosphate total (as P)	Melbourne	Feb 11, 2022	28 Days
- Method: LTM-INO-4040 Phosphate by CFA			
Total Dissolved Solids Dried at 180°C ± 2°C	Melbourne	Feb 11, 2022	28 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			
Per- and Polyfluoroalkyl Substances (PFASs)			

Description	Testing Site	Extracted	Holding Time
Perfluoroalkyl carboxylic acids (PFCAs) - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Feb 11, 2022	28 Days
Perfluoroalkyl sulfonamido substances - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Feb 11, 2022	28 Days
Perfluoroalkyl sulfonic acids (PFSAs) - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Feb 11, 2022	28 Days
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs) - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Feb 11, 2022	28 Days
PFASs Summations - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Feb 10, 2022	

Company Name:	Global Resource Recovery Pty Ltd	Order No.:		Received:	Feb 10, 2022 3:15 PM
Address:	9-11 Maria Street Laverton North VIC 3026	Report #:	862017	Due:	Feb 17, 2022
Project Name:	GLOBAL RESOURCE RECOVERY	Phone:	03 9369 4545	Priority:	5 Day
Project ID:	PROCESSING DWN	Fax:		Contact Name:	Darwin Operation

Eurofins Analytical Services Manager : Michael Morrison

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Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	µg/L: micrograms per litre
ppm: parts per million	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Comments

Quality Control Results were not displayed on the request of the client

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
N09	Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).

Authorised by:

Michael Morrison	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal (VIC)
Joseph Edouard	Senior Analyst-Organic (VIC)
Joseph Edouard	Senior Analyst-PFAS (VIC)
Scott Beddoes	Senior Analyst-Inorganic (VIC)
Vivian Wang	Senior Analyst-Volatile (VIC)



Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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Global Resource Recovery Pty Ltd
9-11 Maria Street
Laverton North
VIC 3026



NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention: Darwin Operation

Report 865419-W
Project name GLOBAL RESOURCE RECOVERY
Project ID PROCESSING DWN
Received Date Feb 22, 2022

Client Sample ID			SWMP
Sample Matrix			Water
Eurofins Sample No.			M22-Fe43999
Date Sampled			Feb 22, 2022
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons			
TRH C6-C9	0.02	mg/L	< 2
TRH C10-C14	0.05	mg/L	1.4
TRH C15-C28	0.1	mg/L	0.9
TRH C29-C36	0.1	mg/L	0.5
TRH C10-C36 (Total)	0.1	mg/L	2.8
Naphthalene ^{N02}	0.01	mg/L	< 1
TRH C6-C10	0.02	mg/L	< 2
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	< 2
TRH >C10-C16	0.05	mg/L	1.1
TRH >C10-C16 less Naphthalene (F2) ^{N01}	0.05	mg/L	1.1
TRH >C16-C34	0.1	mg/L	1.2
TRH >C34-C40	0.1	mg/L	0.2
TRH >C10-C40 (total)*	0.1	mg/L	2.5
BTEX			
Benzene	0.001	mg/L	< 0.1
Toluene	0.001	mg/L	< 0.1
Ethylbenzene	0.001	mg/L	< 0.1
m&p-Xylenes	0.002	mg/L	< 0.2
o-Xylene	0.001	mg/L	< 0.1
Xylenes - Total*	0.003	mg/L	< 0.3
4-Bromofluorobenzene (surr.)	1	%	99
Polycyclic Aromatic Hydrocarbons			
Acenaphthene	0.001	mg/L	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001
Anthracene	0.001	mg/L	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001
Benzo(b&j)fluoranthene ^{N07}	0.001	mg/L	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001
Chrysene	0.001	mg/L	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001
Fluoranthene	0.001	mg/L	< 0.001
Fluorene	0.001	mg/L	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001

Client Sample ID			SWMP
Sample Matrix			Water
Eurofins Sample No.			M22-Fe43999
Date Sampled			Feb 22, 2022
Test/Reference	LOR	Unit	
Polycyclic Aromatic Hydrocarbons			
Naphthalene	0.001	mg/L	< 0.001
Phenanthrene	0.001	mg/L	< 0.001
Pyrene	0.001	mg/L	< 0.001
Total PAH*	0.001	mg/L	< 0.001
2-Fluorobiphenyl (surr.)	1	%	133
p-Terphenyl-d14 (surr.)	1	%	131
Glycols*			
Di-Ethylene Glycol*	20	mg/L	< 20
Ethylene glycol*	20	mg/L	100
Propylene glycol*	20	mg/L	< 20
Triethylene glycol*	20	mg/L	< 20
Polychlorinated Biphenyls			
Aroclor-1016	0.005	mg/L	< 0.005
Aroclor-1221	0.005	mg/L	< 0.005
Aroclor-1232	0.005	mg/L	< 0.005
Aroclor-1242	0.005	mg/L	< 0.005
Aroclor-1248	0.005	mg/L	< 0.005
Aroclor-1254	0.005	mg/L	< 0.005
Aroclor-1260	0.005	mg/L	< 0.005
Total PCB*	0.005	mg/L	< 0.005
Dibutylchloroendate (surr.)	1	%	106
Tetrachloro-m-xylene (surr.)	1	%	124
Phenols (Halogenated)			
2-Chlorophenol	0.003	mg/L	< 0.003
2,4-Dichlorophenol	0.003	mg/L	< 0.003
2,4,5-Trichlorophenol	0.01	mg/L	< 0.01
2,4,6-Trichlorophenol	0.01	mg/L	< 0.01
2,6-Dichlorophenol	0.003	mg/L	< 0.003
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01
Pentachlorophenol	0.01	mg/L	< 0.01
Tetrachlorophenols - Total	0.03	mg/L	< 0.03
Total Halogenated Phenol*	0.01	mg/L	< 0.01
Phenols (non-Halogenated)			
2-Cyclohexyl-4,6-dinitrophenol	0.1	mg/L	< 0.1
2-Methyl-4,6-dinitrophenol	0.03	mg/L	< 0.03
2-Nitrophenol	0.01	mg/L	< 0.01
2,4-Dimethylphenol	0.003	mg/L	0.053
2,4-Dinitrophenol	0.03	mg/L	< 0.03
2-Methylphenol (o-Cresol)	0.003	mg/L	0.063
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	0.15
Total cresols*	0.01	mg/L	0.21
4-Nitrophenol	0.03	mg/L	< 0.03
Dinoseb	0.1	mg/L	< 0.1
Phenol	0.003	mg/L	0.079
Phenol-d6 (surr.)	1	%	29
Total Non-Halogenated Phenol*	0.1	mg/L	0.555

Client Sample ID			SWMP
Sample Matrix			Water
Eurofins Sample No.			M22-Fe43999
Date Sampled			Feb 22, 2022
Test/Reference	LOR	Unit	
Ammonia (as N)	0.01	mg/L	0.05
Chloride	1	mg/L	51
Cyanide (total)	0.005	mg/L	< 0.005
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.25
Phosphate total (as P)	0.01	mg/L	0.05
Sulphate (as SO ₄)	5	mg/L	< 5
Total Dissolved Solids Dried at 180°C ± 2°C	10	mg/L	340
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	1.2
Total Nitrogen (as N)*	0.2	mg/L	1.2
Total Suspended Solids Dried at 103°C–105°C	5	mg/L	7.6
Alkalinity (speciated)			
Bicarbonate Alkalinity (as CaCO ₃)	20	mg/L	180
Carbonate Alkalinity (as CaCO ₃)	10	mg/L	< 10
Hydroxide Alkalinity (as CaCO ₃)	20	mg/L	< 20
Total Alkalinity (as CaCO ₃)	20	mg/L	180
Heavy Metals			
Antimony	0.005	mg/L	< 0.005
Antimony (filtered)	0.005	mg/L	< 0.005
Arsenic	0.001	mg/L	0.013
Arsenic (filtered)	0.001	mg/L	0.007
Barium	0.02	mg/L	0.49
Barium (filtered)	0.02	mg/L	0.49
Beryllium	0.001	mg/L	< 0.001
Beryllium (filtered)	0.001	mg/L	< 0.001
Cadmium	0.0002	mg/L	< 0.0002
Cadmium (filtered)	0.0002	mg/L	< 0.0002
Chromium	0.001	mg/L	0.003
Chromium (filtered)	0.001	mg/L	< 0.001
Cobalt	0.001	mg/L	0.003
Cobalt (filtered)	0.001	mg/L	0.003
Copper	0.001	mg/L	0.006
Copper (filtered)	0.001	mg/L	< 0.001
Lead	0.001	mg/L	0.001
Lead (filtered)	0.001	mg/L	< 0.001
Manganese	0.005	mg/L	0.51
Manganese (filtered)	0.005	mg/L	0.50
Mercury	0.0001	mg/L	< 0.0001
Mercury (filtered)	0.0001	mg/L	< 0.0001
Nickel	0.001	mg/L	0.012
Nickel (filtered)	0.001	mg/L	0.010
Selenium	0.001	mg/L	< 0.001
Selenium (filtered)	0.001	mg/L	< 0.001
Vanadium	0.005	mg/L	0.006
Vanadium (filtered)	0.005	mg/L	< 0.005
Zinc	0.005	mg/L	1.6
Zinc (filtered)	0.005	mg/L	1.6

Client Sample ID			SWMP
Sample Matrix			Water
Eurofins Sample No.			M22-Fe43999
Date Sampled			Feb 22, 2022
Test/Reference	LOR	Unit	
Alkali Metals			
Calcium	0.5	mg/L	15
Magnesium	0.5	mg/L	1.0
Potassium	0.5	mg/L	6.2
Sodium	0.5	mg/L	33
Perfluoroalkyl carboxylic acids (PFCAs)			
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	0.10
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	0.08
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	0.05
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.01	ug/L	0.02
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	< 0.01
Perfluorononanoic acid (PFNA) ^{N11}	0.01	ug/L	< 0.01
Perfluorodecanoic acid (PFDA) ^{N11}	0.01	ug/L	< 0.01
Perfluoroundecanoic acid (PFUnDA) ^{N11}	0.01	ug/L	< 0.01
Perfluorododecanoic acid (PFDoDA) ^{N11}	0.01	ug/L	< 0.01
Perfluorotridecanoic acid (PFTeDA) ^{N15}	0.01	ug/L	< 0.01
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	0.01	ug/L	< 0.01
13C4-PFBA (surr.)	1	%	85
13C5-PFPeA (surr.)	1	%	91
13C5-PFHxA (surr.)	1	%	102
13C4-PFHpA (surr.)	1	%	108
13C8-PFOA (surr.)	1	%	113
13C5-PFNA (surr.)	1	%	99
13C6-PFDA (surr.)	1	%	145
13C2-PFUnDA (surr.)	1	%	104
13C2-PFDoDA (surr.)	1	%	91
13C2-PFTeDA (surr.)	1	%	76
Perfluoroalkyl sulfonamido substances			
Perfluorooctane sulfonamide (FOSA) ^{N11}	0.05	ug/L	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	0.05	ug/L	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	0.05	ug/L	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE) ^{N11}	0.05	ug/L	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE) ^{N11}	0.05	ug/L	< 0.05
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	0.05	ug/L	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	0.05	ug/L	< 0.05
13C8-FOSA (surr.)	1	%	71
D3-N-MeFOSA (surr.)	1	%	85
D5-N-EtFOSA (surr.)	1	%	87
D7-N-MeFOSE (surr.)	1	%	82
D9-N-EtFOSE (surr.)	1	%	81
D5-N-EtFOSAA (surr.)	1	%	134
D3-N-MeFOSAA (surr.)	1	%	148
Perfluoroalkyl sulfonic acids (PFSAs)			
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	< 0.01
Perfluorononanesulfonic acid (PFNS) ^{N15}	0.01	ug/L	< 0.01
Perfluoropropanesulfonic acid (PFPrS) ^{N15}	0.01	ug/L	< 0.01
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.01	ug/L	< 0.01

Client Sample ID			SWMP
Sample Matrix			Water
Eurofins Sample No.			M22-Fe43999
Date Sampled			Feb 22, 2022
Test/Reference	LOR	Unit	
Perfluoroalkyl sulfonic acids (PFASs)			
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	^{N09} 0.02
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	< 0.01
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	^{N09} 0.06
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 0.01
13C3-PFBS (surr.)	1	%	96
18O2-PFHxS (surr.)	1	%	97
13C8-PFOS (surr.)	1	%	86
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	0.01	ug/L	< 0.01
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA) ^{N11}	0.05	ug/L	0.20
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	0.01	ug/L	0.03
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	0.01	ug/L	< 0.01
13C2-4:2 FTSA (surr.)	1	%	139
13C2-6:2 FTSA (surr.)	1	%	87
13C2-8:2 FTSA (surr.)	1	%	143
13C2-10:2 FTSA (surr.)	1	%	96
PFASs Summations			
Sum (PFHxS + PFOS)*	0.01	ug/L	0.08
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	0.06
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	0.08
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	0.56
Sum of PFASs (n=30)*	0.1	ug/L	0.56

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B4A			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Feb 25, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Feb 25, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Feb 25, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	Feb 25, 2022	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
Polycyclic Aromatic Hydrocarbons	Melbourne	Feb 25, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (Halogenated)	Melbourne	Feb 25, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (non-Halogenated)	Melbourne	Feb 25, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Glycols*	Melbourne	Feb 25, 2022	7 Days
- Method: GLYCOLS- US EPA SW846 METHOD 8000 GC-FID.			
Polychlorinated Biphenyls	Melbourne	Feb 25, 2022	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8082)			
Ammonia (as N)	Melbourne	Feb 25, 2022	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Cyanide (total)	Melbourne	Feb 25, 2022	14 Days
- Method: LTM-INO-4020 Total Free WAD Cyanide by CFA			
Total Suspended Solids Dried at 103°C–105°C	Melbourne	Feb 25, 2022	7 Days
- Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry			
Heavy Metals	Melbourne	Feb 25, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals (filtered)	Melbourne	Feb 25, 2022	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Mobil Metals : Metals M15	Melbourne	Feb 25, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins Suite B11C: Na/K/Ca/Mg	Melbourne	Feb 25, 2022	180 Days
- Method: LTM-MET-3010 Alkali Metals by ICP-AES			
Eurofins Suite B11E: Cl/SO4/Alkalinity			
Chloride	Melbourne	Feb 25, 2022	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
Sulphate (as SO4)	Melbourne	Feb 25, 2022	28 Days
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
Alkalinity (speciated)	Melbourne	Feb 25, 2022	14 Days
- Method: LTM-INO-4250 Alkalinity by Electrometric Titration			
Total Nitrogen Set (as N)			
Nitrate & Nitrite (as N)	Melbourne	Feb 25, 2022	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Total Kjeldahl Nitrogen (as N)	Melbourne	Feb 25, 2022	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Eurofins Suite B19A: Total N (TKN, NOx), Total P			
Phosphate total (as P)	Melbourne	Feb 25, 2022	28 Days
- Method: LTM-INO-4040 Phosphate by CFA			
Total Dissolved Solids Dried at 180°C ± 2°C	Melbourne	Feb 25, 2022	28 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			
Per- and Polyfluoroalkyl Substances (PFASs)			

Description	Testing Site	Extracted	Holding Time
Perfluoroalkyl carboxylic acids (PFCAs) - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Feb 25, 2022	28 Days
Perfluoroalkyl sulfonamido substances - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Feb 25, 2022	28 Days
Perfluoroalkyl sulfonic acids (PFSAs) - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Feb 25, 2022	28 Days
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs) - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Feb 25, 2022	28 Days
PFASs Summations - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Feb 22, 2022	

Company Name:	Global Resource Recovery Pty Ltd	Order No.:		Received:	Feb 22, 2022 10:30 AM
Address:	9-11 Maria Street Laverton North VIC 3026	Report #:	865419	Due:	Mar 1, 2022
		Phone:	03 9369 4545	Priority:	5 Day
		Fax:		Contact Name:	Darwin Operation
Project Name:	GLOBAL RESOURCE RECOVERY				
Project ID:	PROCESSING DWN				

Eurofins Analytical Services Manager : Michael Morrison

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Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	µg/L: micrograms per litre
ppm: parts per million	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Comments

Eurofins | Environment Testing accreditation number 1261, site 18217 is currently in progress of a controlled transition to a new custom built location at 179 Magowar Road, Girraween, NSW 2145. All results on this report denoted as being performed by Eurofins | Environment Testing Unit F3, Building F, 16 Mars road, Lane Cove West, NSW 2066, corporate site 18217, will have been performed on either Lane Cove or new Girraween site

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
N09	Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).

Authorised by:

Catherine Wilson	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal (VIC)
Joseph Edouard	Senior Analyst-Organic (VIC)
Joseph Edouard	Senior Analyst-PFAS (VIC)
Scott Beddoes	Senior Analyst-Inorganic (VIC)
Vivian Wang	Senior Analyst-Volatile (VIC)



Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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Global Resource Recovery Pty Ltd
9-11 Maria Street
Laverton North
VIC 3026



NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
 NATA is a signatory to the ILAC Mutual Recognition
 Arrangement for the mutual recognition of the
 equivalence of testing, medical testing, calibration,
 inspection, proficiency testing scheme providers and
 reference materials producers reports and certificates.

Attention: **Darwin Operation**

Report **871134-W**
 Project name **GLOBAL RESOURCE RECOVERY**
 Project ID **Processing DWN**
 Received Date **Mar 15, 2022**

Client Sample ID			G01 SWMP
Sample Matrix			Trade Waste
Eurofins Sample No.			M22-Ma28248
Date Sampled			Mar 15, 2022
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons			
TRH C6-C9	0.02	mg/L	< 2
TRH C10-C14	0.05	mg/L	0.34
TRH C15-C28	0.1	mg/L	2.1
TRH C29-C36	0.1	mg/L	1.4
TRH C10-C36 (Total)	0.1	mg/L	3.84
Naphthalene ^{N02}	0.01	mg/L	< 1
TRH C6-C10	0.02	mg/L	< 2
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	< 2
TRH >C10-C16	0.05	mg/L	0.48
TRH >C10-C16 less Naphthalene (F2) ^{N01}	0.05	mg/L	< 1
TRH >C16-C34	0.1	mg/L	3.0
TRH >C34-C40	0.1	mg/L	0.6
TRH >C10-C40 (total)*	0.1	mg/L	4.08
BTEX			
Benzene	0.001	mg/L	< 0.1
Toluene	0.001	mg/L	< 0.1
Ethylbenzene	0.001	mg/L	< 0.1
m&p-Xylenes	0.002	mg/L	< 0.2
o-Xylene	0.001	mg/L	< 0.1
Xylenes - Total*	0.003	mg/L	< 0.3
4-Bromofluorobenzene (surr.)	1	%	89
Polycyclic Aromatic Hydrocarbons			
Acenaphthene	0.001	mg/L	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001
Anthracene	0.001	mg/L	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001
Benzo(b&j)fluoranthene ^{N07}	0.001	mg/L	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001
Chrysene	0.001	mg/L	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001
Fluoranthene	0.001	mg/L	< 0.001
Fluorene	0.001	mg/L	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001

Client Sample ID			G01-SWMP
Sample Matrix			Trade Waste
Eurofins Sample No.			M22-Ma28248
Date Sampled			Mar 15, 2022
Test/Reference	LOR	Unit	
Polycyclic Aromatic Hydrocarbons			
Naphthalene	0.001	mg/L	< 0.001
Phenanthrene	0.001	mg/L	< 0.001
Pyrene	0.001	mg/L	< 0.001
Total PAH*	0.001	mg/L	< 0.001
2-Fluorobiphenyl (surr.)	1	%	88
p-Terphenyl-d14 (surr.)	1	%	81
Glycols*			
Di-Ethylene Glycol*	20	mg/L	< 20
Ethylene glycol*	20	mg/L	< 20
Propylene glycol*	20	mg/L	< 20
Triethylene glycol*	20	mg/L	< 20
Polychlorinated Biphenyls			
Aroclor-1016	0.005	mg/L	< 0.005
Aroclor-1221	0.005	mg/L	< 0.005
Aroclor-1232	0.005	mg/L	< 0.005
Aroclor-1242	0.005	mg/L	< 0.005
Aroclor-1248	0.005	mg/L	< 0.005
Aroclor-1254	0.005	mg/L	< 0.005
Aroclor-1260	0.005	mg/L	< 0.005
Total PCB*	0.005	mg/L	< 0.005
Dibutylchloroendate (surr.)	1	%	105
Tetrachloro-m-xylene (surr.)	1	%	81
Phenols (Halogenated)			
2-Chlorophenol	0.003	mg/L	< 0.003
2,4-Dichlorophenol	0.003	mg/L	< 0.003
2,4,5-Trichlorophenol	0.01	mg/L	< 0.01
2,4,6-Trichlorophenol	0.01	mg/L	< 0.01
2,6-Dichlorophenol	0.003	mg/L	< 0.003
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01
Pentachlorophenol	0.01	mg/L	< 0.01
Tetrachlorophenols - Total	0.03	mg/L	< 0.03
Total Halogenated Phenol*	0.01	mg/L	< 0.01
Phenols (non-Halogenated)			
2-Cyclohexyl-4,6-dinitrophenol	0.1	mg/L	< 0.1
2-Methyl-4,6-dinitrophenol	0.03	mg/L	< 0.03
2-Nitrophenol	0.01	mg/L	< 0.01
2,4-Dimethylphenol	0.003	mg/L	< 0.003
2,4-Dinitrophenol	0.03	mg/L	< 0.03
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006
Total cresols*	0.01	mg/L	< 0.01
4-Nitrophenol	0.03	mg/L	< 0.03
Dinoseb	0.1	mg/L	< 0.1
Phenol	0.003	mg/L	< 0.003
Phenol-d6 (surr.)	1	%	40
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1

Client Sample ID			G01 SWMP
Sample Matrix			Trade Waste
Eurofins Sample No.			M22-Ma28248
Date Sampled			Mar 15, 2022
Test/Reference	LOR	Unit	
Ammonia (as N)	0.05	mg/L	< 0.05
Chloride	1	mg/L	20
Cyanide (total)	0.01	mg/L	< 0.01
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05
Phosphate total (as P)	0.01	mg/L	0.07
Sulphate (as SO ₄)	5	mg/L	< 5
Total Dissolved Solids Dried at 180°C ± 2°C	10	mg/L	64
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	0.4
Total Nitrogen (as N)*	0.2	mg/L	0.4
Total Suspended Solids Dried at 103°C–105°C	5	mg/L	24
Alkalinity (speciated)			
Bicarbonate Alkalinity (as CaCO ₃)	20	mg/L	38
Carbonate Alkalinity (as CaCO ₃)	20	mg/L	< 20
Hydroxide Alkalinity (as CaCO ₃)	20	mg/L	< 20
Total Alkalinity (as CaCO ₃)	20	mg/L	38
Heavy Metals			
Antimony	0.05	mg/L	< 0.05
Antimony (filtered)	0.005	mg/L	< 0.05
Arsenic	0.01	mg/L	< 0.01
Arsenic (filtered)	0.001	mg/L	< 0.01
Barium	0.02	mg/L	0.13
Barium (filtered)	0.02	mg/L	0.14
Beryllium	0.01	mg/L	< 0.01
Beryllium (filtered)	0.001	mg/L	< 0.01
Boron	0.05	mg/L	< 0.05
Boron (filtered)	0.05	mg/L	< 0.05
Cadmium	0.001	mg/L	< 0.002
Cadmium (filtered)	0.0002	mg/L	< 0.002
Chromium	0.01	mg/L	< 0.01
Chromium (filtered)	0.001	mg/L	< 0.01
Cobalt	0.01	mg/L	< 0.01
Cobalt (filtered)	0.001	mg/L	< 0.01
Copper	0.01	mg/L	< 0.01
Copper (filtered)	0.001	mg/L	< 0.01
Lead	0.01	mg/L	< 0.01
Lead (filtered)	0.001	mg/L	< 0.01
Manganese	0.05	mg/L	0.13
Manganese (filtered)	0.005	mg/L	0.12
Mercury	0.001	mg/L	< 0.001
Mercury (filtered)	0.001	mg/L	< 0.001
Nickel	0.01	mg/L	< 0.01
Nickel (filtered)	0.001	mg/L	< 0.01
Selenium	0.05	mg/L	< 0.05
Selenium (filtered)	0.001	mg/L	< 0.01
Vanadium	0.05	mg/L	< 0.05
Vanadium (filtered)	0.005	mg/L	< 0.05
Zinc	0.01	mg/L	0.57
Zinc (filtered)	0.005	mg/L	0.45

Client Sample ID			G01 SWMP
Sample Matrix			Trade Waste
Eurofins Sample No.			M22-Ma28248
Date Sampled			Mar 15, 2022
Test/Reference	LOR	Unit	
Alkali Metals			
Calcium	0.5	mg/L	9.9
Magnesium	0.5	mg/L	0.5
Potassium	0.5	mg/L	2.1
Sodium	0.5	mg/L	20
Perfluoroalkyl carboxylic acids (PFCAs)			
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	< 0.05
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	0.03
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	0.02
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.01	ug/L	< 0.01
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	< 0.01
Perfluorononanoic acid (PFNA) ^{N11}	0.01	ug/L	< 0.01
Perfluorodecanoic acid (PFDA) ^{N11}	0.01	ug/L	< 0.01
Perfluoroundecanoic acid (PFUnDA) ^{N11}	0.01	ug/L	< 0.01
Perfluorododecanoic acid (PFDoDA) ^{N11}	0.01	ug/L	< 0.01
Perfluorotridecanoic acid (PFTTrDA) ^{N15}	0.01	ug/L	< 0.01
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	0.01	ug/L	< 0.01
13C4-PFBA (surr.)	1	%	68
13C5-PFPeA (surr.)	1	%	86
13C5-PFHxA (surr.)	1	%	107
13C4-PFHpA (surr.)	1	%	81
13C8-PFOA (surr.)	1	%	78
13C5-PFNA (surr.)	1	%	82
13C6-PFDA (surr.)	1	%	117
13C2-PFUnDA (surr.)	1	%	100
13C2-PFDoDA (surr.)	1	%	96
13C2-PFTeDA (surr.)	1	%	134
Perfluoroalkyl sulfonamido substances			
Perfluorooctane sulfonamide (FOSA) ^{N11}	0.05	ug/L	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	0.05	ug/L	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	0.05	ug/L	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE) ^{N11}	0.05	ug/L	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE) ^{N11}	0.05	ug/L	< 0.05
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	0.05	ug/L	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	0.05	ug/L	< 0.05
13C8-FOSA (surr.)	1	%	110
D3-N-MeFOSA (surr.)	1	%	141
D5-N-EtFOSA (surr.)	1	%	92
D7-N-MeFOSE (surr.)	1	%	95
D9-N-EtFOSE (surr.)	1	%	94
D5-N-EtFOSAA (surr.)	1	%	62
D3-N-MeFOSAA (surr.)	1	%	48
Perfluoroalkyl sulfonic acids (PFSAs)			
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	< 0.01
Perfluorononanesulfonic acid (PFNS) ^{N15}	0.01	ug/L	< 0.01
Perfluoropropanesulfonic acid (PFPrS) ^{N15}	0.01	ug/L	< 0.01
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.01	ug/L	< 0.01

Client Sample ID			G01 SWMP
Sample Matrix			Trade Waste
Eurofins Sample No.			M22-Ma28248
Date Sampled			Mar 15, 2022
Test/Reference	LOR	Unit	
Perfluoroalkyl sulfonic acids (PFASs)			
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	< 0.01
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	< 0.01
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	^{N09} 0.04
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 0.01
13C3-PFBS (surr.)	1	%	81
18O2-PFHxS (surr.)	1	%	68
13C8-PFOS (surr.)	1	%	92
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	0.01	ug/L	< 0.01
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA) ^{N11}	0.05	ug/L	0.15
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	0.01	ug/L	< 0.01
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	0.01	ug/L	< 0.01
13C2-4:2 FTSA (surr.)	1	%	95
13C2-6:2 FTSA (surr.)	1	%	105
13C2-8:2 FTSA (surr.)	1	%	117
13C2-10:2 FTSA (surr.)	1	%	76
PFASs Summations			
Sum (PFHxS + PFOS)*	0.01	ug/L	0.04
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	0.04
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	0.04
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	0.24
Sum of PFASs (n=30)*	0.1	ug/L	0.24

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B4A			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Mar 18, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Mar 18, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Mar 18, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	Mar 18, 2022	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
Polycyclic Aromatic Hydrocarbons	Melbourne	Mar 18, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (Halogenated)	Melbourne	Mar 18, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (non-Halogenated)	Melbourne	Mar 18, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Glycols*	Melbourne	Mar 18, 2022	7 Days
- Method: GLYCOLS- US EPA SW846 METHOD 8000 GC-FID.			
Polychlorinated Biphenyls	Melbourne	Mar 18, 2022	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8082)			
Ammonia (as N)	Melbourne	Mar 18, 2022	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Cyanide (total)	Melbourne	Mar 18, 2022	14 Days
- Method: LTM-INO-4020 Total Free WAD Cyanide by CFA			
Total Suspended Solids Dried at 103°C–105°C	Melbourne	Mar 18, 2022	7 Days
- Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry			
Heavy Metals	Melbourne	Mar 24, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals (filtered)	Melbourne	Mar 24, 2022	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Mobil Metals : Metals M15	Melbourne	Mar 18, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins Suite B11C: Na/K/Ca/Mg	Melbourne	Mar 18, 2022	180 Days
- Method: LTM-MET-3010 Alkali Metals by ICP-AES			
Eurofins Suite B11E: Cl/SO4/Alkalinity			
Chloride	Melbourne	Mar 18, 2022	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
Sulphate (as SO4)	Melbourne	Mar 18, 2022	28 Days
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
Alkalinity (speciated)	Melbourne	Mar 18, 2022	14 Days
- Method: LTM-INO-4250 Alkalinity by Electrometric Titration			
Total Nitrogen Set (as N)			
Nitrate & Nitrite (as N)	Melbourne	Mar 18, 2022	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Total Kjeldahl Nitrogen (as N)	Melbourne	Mar 18, 2022	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Eurofins Suite B19A: Total N (TKN, NOx), Total P			
Phosphate total (as P)	Melbourne	Mar 21, 2022	28 Days
- Method: LTM-INO-4040 Phosphate by CFA			
Total Dissolved Solids Dried at 180°C ± 2°C	Melbourne	Mar 18, 2022	28 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			
Per- and Polyfluoroalkyl Substances (PFASs)			

Description	Testing Site	Extracted	Holding Time
Perfluoroalkyl carboxylic acids (PFCAs) - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Mar 18, 2022	28 Days
Perfluoroalkyl sulfonamido substances - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Mar 18, 2022	28 Days
Perfluoroalkyl sulfonic acids (PFSAs) - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Mar 18, 2022	28 Days
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs) - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Mar 18, 2022	28 Days
PFASs Summations - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Mar 15, 2022	

Company Name:	Global Resource Recovery Pty Ltd	Order No.:	GRR DARwin	Received:	Mar 15, 2022 9:30 AM
Address:	9-11 Maria Street Laverton North VIC 3026	Report #:	871134	Due:	Mar 22, 2022
Project Name:	GLOBAL RESOURCE RECOVERY	Phone:	03 9369 4545	Priority:	5 Day
Project ID:	Processing DWN	Fax:		Contact Name:	Darwin Operation

Eurofins Analytical Services Manager : Michael Morrison

Sample Detail						Ammonia (as N)	Antimony	Antimony (filtered)	Arsenic	Arsenic (filtered)	Barium	Barium (filtered)	Beryllium	Beryllium (filtered)	Cadmium	Cadmium (filtered)	Chromium	Chromium (filtered)	Cobalt	Cobalt (filtered)	Copper	Copper (filtered)	Cyanide (total)	Lead	Lead (filtered)	Manganese	Manganese (filtered)	Mercury	Mercury (filtered)	Nickel	Nickel (filtered)	Selenium	Selenium (filtered)	Total Suspended Solids Dried at	Vanadium	Vanadium (filtered)	Zinc	Zinc (filtered)	Glycols*	Polychlorinated Biphenyls	Eurofins Suite B4A	Eurofins Suite B19A: Total N (TKN, NOx)	Eurofins Suite B11E: Cl/SO4/Alkalinity	Per- and Polyfluoroalkyl Substances (PFASs)	Eurofins Suite B11C: Na/K/Ca/Mg	Total Dissolved Solids Dried at 180°C ± 2°C
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA # 1261 Site # 18217																																														
Brisbane Laboratory - NATA # 1261 Site # 20794																																														
Mayfield Laboratory - NATA # 1261 Site # 25079																																														
Perth Laboratory - NATA # 2377 Site # 2370																																														
External Laboratory																																														
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID																																									
1	SWMP	Mar 15, 2022	8:30AM	Trade Waste	M22-Ma28248	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Test Counts						1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	µg/L: micrograms per litre
ppm: parts per million	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Comments

Eurofins | Environment Testing accreditation number 1261, site 18217 is currently in progress of a controlled transition to a new custom built location at 179 Magowar Road, Girraween, NSW 2145. All results on this report denoted as being performed by Eurofins | Environment Testing Unit F3, Building F, 16 Mars road, Lane Cove West, NSW 2066, corporate site 18217, will have been performed on either Lane Cove or new Girraween site

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
G01	The LORs have been raised due to matrix interference
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
N09	Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).

Authorised by:

Catherine Wilson	Analytical Services Manager
Vivian Wang	Senior Analyst-Volatile (VIC)
Scott Beddoes	Senior Analyst-Inorganic (VIC)
Joseph Edouard	Senior Analyst-Organic (VIC)
Emily Rosenberg	Senior Analyst-Metal (VIC)
Joseph Edouard	Senior Analyst-PFAS (VIC)



Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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Global Resource Recovery Pty Ltd
9-11 Maria Street
Laverton North
VIC 3026



NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
 NATA is a signatory to the ILAC Mutual Recognition
 Arrangement for the mutual recognition of the
 equivalence of testing, medical testing, calibration,
 inspection, proficiency testing scheme providers and
 reference materials producers reports and certificates.

Attention: **Darwin Operation**

Report **874391-W**
 Project name **GLOBAL RESOURCE RECOVERY**
 Project ID **Processing DWN**
 Received Date **Mar 25, 2022**

Client Sample ID			SWMP
Sample Matrix			Trade Waste
Eurofins Sample No.			M22-Ma53384
Date Sampled			Mar 25, 2022
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons			
TRH C6-C9	0.02	mg/L	< 0.02
TRH C10-C14	0.05	mg/L	0.84
TRH C15-C28	0.1	mg/L	0.8
TRH C29-C36	0.1	mg/L	0.2
TRH C10-C36 (Total)	0.1	mg/L	1.84
Naphthalene ^{N02}	0.01	mg/L	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	< 0.02
TRH >C10-C16	0.05	mg/L	0.86
TRH >C10-C16 less Naphthalene (F2) ^{N01}	0.05	mg/L	0.86
TRH >C16-C34	0.1	mg/L	0.8
TRH >C34-C40	0.1	mg/L	0.1
TRH >C10-C40 (total)*	0.1	mg/L	1.76
BTEX			
Benzene	0.001	mg/L	< 0.001
Toluene	0.001	mg/L	0.001
Ethylbenzene	0.001	mg/L	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002
o-Xylene	0.001	mg/L	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003
4-Bromofluorobenzene (surr.)	1	%	87
Polycyclic Aromatic Hydrocarbons			
Acenaphthene	0.001	mg/L	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001
Anthracene	0.001	mg/L	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001
Benzo(b&j)fluoranthene ^{N07}	0.001	mg/L	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001
Chrysene	0.001	mg/L	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001
Fluoranthene	0.001	mg/L	< 0.001
Fluorene	0.001	mg/L	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001

Client Sample ID			SWMP
Sample Matrix			Trade Waste
Eurofins Sample No.			M22-Ma53384
Date Sampled			Mar 25, 2022
Test/Reference	LOR	Unit	
Polycyclic Aromatic Hydrocarbons			
Naphthalene	0.001	mg/L	< 0.001
Phenanthrene	0.001	mg/L	< 0.001
Pyrene	0.001	mg/L	< 0.001
Total PAH*	0.001	mg/L	< 0.001
2-Fluorobiphenyl (surr.)	1	%	85
p-Terphenyl-d14 (surr.)	1	%	70
Glycols*			
Di-Ethylene Glycol*	20	mg/L	< 20
Ethylene glycol*	20	mg/L	< 20
Propylene glycol*	20	mg/L	< 20
Triethylene glycol*	20	mg/L	< 20
Polychlorinated Biphenyls			
Aroclor-1016	0.005	mg/L	< 0.005
Aroclor-1221	0.005	mg/L	< 0.005
Aroclor-1232	0.005	mg/L	< 0.005
Aroclor-1242	0.005	mg/L	< 0.005
Aroclor-1248	0.005	mg/L	< 0.005
Aroclor-1254	0.005	mg/L	< 0.005
Aroclor-1260	0.005	mg/L	< 0.005
Total PCB*	0.005	mg/L	< 0.005
Dibutylchloroendate (surr.)	1	%	141
Tetrachloro-m-xylene (surr.)	1	%	98
Phenols (Halogenated)			
2-Chlorophenol	0.003	mg/L	< 0.003
2,4-Dichlorophenol	0.003	mg/L	< 0.003
2,4,5-Trichlorophenol	0.01	mg/L	< 0.01
2,4,6-Trichlorophenol	0.01	mg/L	< 0.01
2,6-Dichlorophenol	0.003	mg/L	< 0.003
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01
Pentachlorophenol	0.01	mg/L	< 0.01
Tetrachlorophenols - Total	0.03	mg/L	< 0.03
Total Halogenated Phenol*	0.01	mg/L	< 0.01
Phenols (non-Halogenated)			
2-Cyclohexyl-4,6-dinitrophenol	0.1	mg/L	< 0.1
2-Methyl-4,6-dinitrophenol	0.03	mg/L	< 0.03
2-Nitrophenol	0.01	mg/L	< 0.01
2,4-Dimethylphenol	0.003	mg/L	< 0.003
2,4-Dinitrophenol	0.03	mg/L	< 0.03
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006
Total cresols*	0.01	mg/L	< 0.01
4-Nitrophenol	0.03	mg/L	< 0.03
Dinoseb	0.1	mg/L	< 0.1
Phenol	0.003	mg/L	0.004
Phenol-d6 (surr.)	1	%	82
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1

Client Sample ID			SWMP
Sample Matrix			Trade Waste
Eurofins Sample No.			M22-Ma53384
Date Sampled			Mar 25, 2022
Test/Reference	LOR	Unit	
Ammonia (as N)	0.05	mg/L	< 0.05
Chloride	1	mg/L	50
Cyanide (total)	0.01	mg/L	< 0.01
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05
Phosphate total (as P)	0.01	mg/L	0.08
Sulphate (as SO ₄)	5	mg/L	< 5
Total Dissolved Solids Dried at 180°C ± 2°C	10	mg/L	280
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	0.69
Total Nitrogen (as N)*	0.2	mg/L	0.69
Total Suspended Solids Dried at 103°C–105°C	5	mg/L	21
Alkalinity (speciated)			
Bicarbonate Alkalinity (as CaCO ₃)	20	mg/L	110
Carbonate Alkalinity (as CaCO ₃)	20	mg/L	< 20
Hydroxide Alkalinity (as CaCO ₃)	20	mg/L	< 20
Total Alkalinity (as CaCO ₃)	20	mg/L	110
Heavy Metals			
Antimony	0.05	mg/L	< 0.05
Antimony (filtered)	0.005	mg/L	< 0.01
Arsenic	0.01	mg/L	< 0.01
Arsenic (filtered)	0.001	mg/L	< 0.01
Barium	0.02	mg/L	0.41
Barium (filtered)	0.02	mg/L	0.43
Beryllium	0.01	mg/L	< 0.01
Beryllium (filtered)	0.001	mg/L	< 0.01
Boron	0.05	mg/L	< 1
Boron (filtered)	0.05	mg/L	< 1
Cadmium	0.001	mg/L	< 0.001
Cadmium (filtered)	0.0002	mg/L	< 0.001
Chromium	0.01	mg/L	< 0.01
Chromium (filtered)	0.001	mg/L	< 0.01
Cobalt	0.01	mg/L	< 0.01
Cobalt (filtered)	0.001	mg/L	< 0.01
Copper	0.01	mg/L	< 0.01
Copper (filtered)	0.001	mg/L	< 0.01
Lead	0.01	mg/L	< 0.01
Lead (filtered)	0.001	mg/L	< 0.01
Manganese	0.05	mg/L	0.46
Manganese (filtered)	0.005	mg/L	0.49
Mercury	0.001	mg/L	< 0.001
Mercury (filtered)	0.001	mg/L	< 0.001
Nickel	0.01	mg/L	< 0.01
Nickel (filtered)	0.001	mg/L	0.050
Selenium	0.05	mg/L	< 0.05
Selenium (filtered)	0.001	mg/L	< 0.01
Vanadium	0.05	mg/L	< 0.05
Vanadium (filtered)	0.005	mg/L	< 0.05
Zinc	0.01	mg/L	0.17
Zinc (filtered)	0.005	mg/L	0.14

Client Sample ID			SWMP
Sample Matrix			Trade Waste
Eurofins Sample No.			M22-Ma53384
Date Sampled			Mar 25, 2022
Test/Reference	LOR	Unit	
Alkali Metals			
Calcium	0.5	mg/L	12
Magnesium	0.5	mg/L	< 5
Potassium	0.5	mg/L	< 5
Sodium	0.5	mg/L	43
Perfluoroalkyl carboxylic acids (PFCAs)			
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	< 0.05
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	^{N09} 0.14
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	^{N09} 0.10
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.01	ug/L	^{N09} 0.05
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	0.02
Perfluorononanoic acid (PFNA) ^{N11}	0.01	ug/L	< 0.01
Perfluorodecanoic acid (PFDA) ^{N11}	0.01	ug/L	< 0.01
Perfluoroundecanoic acid (PFUnDA) ^{N11}	0.01	ug/L	< 0.01
Perfluorododecanoic acid (PFDoDA) ^{N11}	0.01	ug/L	< 0.01
Perfluorotridecanoic acid (PFTeDA) ^{N15}	0.01	ug/L	< 0.01
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	0.01	ug/L	< 0.01
13C4-PFBA (surr.)	1	%	107
13C5-PFPeA (surr.)	1	%	113
13C5-PFHxA (surr.)	1	%	111
13C4-PFHpA (surr.)	1	%	109
13C8-PFOA (surr.)	1	%	110
13C5-PFNA (surr.)	1	%	113
13C6-PFDA (surr.)	1	%	117
13C2-PFUnDA (surr.)	1	%	124
13C2-PFDoDA (surr.)	1	%	142
13C2-PFTeDA (surr.)	1	%	120
Perfluoroalkyl sulfonamido substances			
Perfluorooctane sulfonamide (FOSA) ^{N11}	0.05	ug/L	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	0.05	ug/L	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	0.05	ug/L	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE) ^{N11}	0.05	ug/L	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE) ^{N11}	0.05	ug/L	< 0.05
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	0.05	ug/L	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	0.05	ug/L	< 0.05
13C8-FOSA (surr.)	1	%	111
D3-N-MeFOSA (surr.)	1	%	116
D5-N-EtFOSA (surr.)	1	%	127
D7-N-MeFOSE (surr.)	1	%	123
D9-N-EtFOSE (surr.)	1	%	127
D5-N-EtFOSAA (surr.)	1	%	139
D3-N-MeFOSAA (surr.)	1	%	106
Perfluoroalkyl sulfonic acids (PFSAs)			
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	< 0.01
Perfluorononanesulfonic acid (PFNS) ^{N15}	0.01	ug/L	< 0.01
Perfluoropropanesulfonic acid (PFPrS) ^{N15}	0.01	ug/L	< 0.01
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.01	ug/L	< 0.01

Client Sample ID			SWMP
Sample Matrix			Trade Waste
Eurofins Sample No.			M22-Ma53384
Date Sampled			Mar 25, 2022
Test/Reference	LOR	Unit	
Perfluoroalkyl sulfonic acids (PFASs)			
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	< 0.01
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	< 0.01
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	^{N09} 0.09
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 0.01
13C3-PFBS (surr.)	1	%	113
18O2-PFHxS (surr.)	1	%	119
13C8-PFOS (surr.)	1	%	119
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	0.01	ug/L	< 0.01
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA) ^{N11}	0.05	ug/L	0.41
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	0.01	ug/L	0.15
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	0.01	ug/L	< 0.01
13C2-4:2 FTSA (surr.)	1	%	109
13C2-6:2 FTSA (surr.)	1	%	146
13C2-8:2 FTSA (surr.)	1	%	136
13C2-10:2 FTSA (surr.)	1	%	135
PFASs Summations			
Sum (PFHxS + PFOS)*	0.01	ug/L	0.09
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	0.11
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	0.11
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	0.96
Sum of PFASs (n=30)*	0.1	ug/L	0.96

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B4A			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Mar 29, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Mar 29, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Mar 29, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	Mar 29, 2022	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
Polycyclic Aromatic Hydrocarbons	Melbourne	Mar 29, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (Halogenated)	Melbourne	Mar 29, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (non-Halogenated)	Melbourne	Mar 29, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Glycols*	Melbourne	Mar 29, 2022	7 Days
- Method: GLYCOLS- US EPA SW846 METHOD 8000 GC-FID.			
Polychlorinated Biphenyls	Melbourne	Mar 29, 2022	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8082)			
Ammonia (as N)	Melbourne	Mar 29, 2022	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Cyanide (total)	Melbourne	Mar 31, 2022	14 Days
- Method: LTM-INO-4020 Total Free WAD Cyanide by CFA			
Total Suspended Solids Dried at 103°C–105°C	Melbourne	Mar 29, 2022	7 Days
- Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry			
Heavy Metals	Melbourne	Mar 29, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals (filtered)	Melbourne	Mar 29, 2022	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Mobil Metals : Metals M15	Melbourne	Mar 29, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins Suite B11C: Na/K/Ca/Mg	Melbourne	Mar 29, 2022	180 Days
- Method: LTM-MET-3010 Alkali Metals by ICP-AES			
Eurofins Suite B11E: Cl/SO4/Alkalinity			
Chloride	Melbourne	Mar 29, 2022	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
Sulphate (as SO4)	Melbourne	Mar 29, 2022	28 Days
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
Alkalinity (speciated)	Melbourne	Mar 29, 2022	14 Days
- Method: LTM-INO-4250 Alkalinity by Electrometric Titration			
Total Nitrogen Set (as N)			
Nitrate & Nitrite (as N)	Melbourne	Mar 29, 2022	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Total Kjeldahl Nitrogen (as N)	Melbourne	Mar 29, 2022	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Eurofins Suite B19A: Total N (TKN, NOx), Total P			
Phosphate total (as P)	Melbourne	Mar 29, 2022	28 Days
- Method: LTM-INO-4040 Phosphate by CFA			
Total Dissolved Solids Dried at 180°C ± 2°C	Melbourne	Mar 29, 2022	28 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			
Per- and Polyfluoroalkyl Substances (PFASs)			

Description	Testing Site	Extracted	Holding Time
Perfluoroalkyl carboxylic acids (PFCAs) - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Mar 29, 2022	28 Days
Perfluoroalkyl sulfonamido substances - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Mar 29, 2022	28 Days
Perfluoroalkyl sulfonic acids (PFSAs) - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Mar 29, 2022	28 Days
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs) - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Mar 29, 2022	28 Days
PFASs Summations - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Mar 25, 2022	

Company Name:	Global Resource Recovery Pty Ltd	Order No.:	GRR Darwin	Received:	Mar 25, 2022 11:10 AM
Address:	9-11 Maria Street Laverton North VIC 3026	Report #:	874391	Due:	Apr 1, 2022
		Phone:	03 9369 4545	Priority:	5 Day
		Fax:		Contact Name:	- ALL INVOICES
Project Name:	GLOBAL RESOURCE RECOVERY				
Project ID:	Processing DWN				

Eurofins Analytical Services Manager : Michael Morrison

Sample Detail						Ammonia (as N)	Antimony	Antimony (filtered)	Arsenic	Arsenic (filtered)	Barium	Barium (filtered)	Beryllium	Beryllium (filtered)	Boron	Boron (filtered)	Cadmium	Cadmium (filtered)	Cobalt	Cobalt (filtered)	Copper	Copper (filtered)	Cyanide (total)	Lead	Lead (filtered)	Manganese	Manganese (filtered)	Mercury	Mercury (filtered)	Nickel	Nickel (filtered)	Selenium	Selenium (filtered)	Total Suspended Solids Dried at	Vanadium	Vanadium (filtered)	Zinc	Zinc (filtered)	Glycols*	Polychlorinated Biphenyls	Eurofins Suite B4A	Eurofins Suite B19A: Total N (TKN, NOx)	Eurofins Suite B11E: Cl/SO4/Alkalinity	Per- and Polyfluorinated Substances (PFASs)	Eurofins Suite B11C: Na/K/Ca/Mg	Total Dissolved Solids Dried at 180°C ± 2°C
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA # 1261 Site # 18217																																														
Brisbane Laboratory - NATA # 1261 Site # 20794																																														
Mayfield Laboratory - NATA # 1261 Site # 25079																																														
Perth Laboratory - NATA # 2377 Site # 2370																																														
External Laboratory																																														
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID																																									
1	SWMP	Mar 25, 2022	7:30AM	Trade Waste	M22-Ma53384	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Test Counts						1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	µg/L: micrograms per litre
ppm: parts per million	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Comments

Quality Control Results were not displayed on the request of the client

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
N09	Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).

Authorised by:

Michael Morrison	Analytical Services Manager
Mary Makarios	Senior Analyst (NSW)
Scott Beddoes	Senior Analyst (NSW)
Joseph Edouard	Senior Analyst (VIC)
Carroll Lee	Senior Analyst (NSW)



Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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Global Resource Recovery Pty Ltd
9-11 Maria Street
Laverton North
VIC 3026



NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention: Darwin Operation

Report 880056-W
Project name GLOBAL RESOURCE RECOVERY
Project ID PROCESSING DWN
Received Date Apr 13, 2022

Client Sample ID			SWMP
Sample Matrix			Water
Eurofins Sample No.			M22- Ap0029612
Date Sampled			Apr 12, 2022
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons			
TRH C6-C9	0.02	mg/L	< 2
TRH C10-C14	0.05	mg/L	0.07
TRH C15-C28	0.1	mg/L	0.2
TRH C29-C36	0.1	mg/L	0.1
TRH C10-C36 (Total)	0.1	mg/L	0.37
Naphthalene ^{N02}	0.01	mg/L	< 1
TRH C6-C10	0.02	mg/L	< 2
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	< 2
TRH >C10-C16	0.05	mg/L	0.07
TRH >C10-C16 less Naphthalene (F2) ^{N01}	0.05	mg/L	< 1
TRH >C16-C34	0.1	mg/L	0.3
TRH >C34-C40	0.1	mg/L	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	0.37
BTEX			
Benzene	0.001	mg/L	< 0.1
Toluene	0.001	mg/L	< 0.1
Ethylbenzene	0.001	mg/L	< 0.1
m&p-Xylenes	0.002	mg/L	< 0.2
o-Xylene	0.001	mg/L	< 0.1
Xylenes - Total*	0.003	mg/L	< 0.3
4-Bromofluorobenzene (surr.)	1	%	95
Polycyclic Aromatic Hydrocarbons			
Acenaphthene	0.001	mg/L	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001
Anthracene	0.001	mg/L	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001
Benzo(b&j)fluoranthene ^{N07}	0.001	mg/L	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001
Chrysene	0.001	mg/L	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001
Fluoranthene	0.001	mg/L	< 0.001
Fluorene	0.001	mg/L	< 0.001
Indeno(1,2,3-cd)pyrene	0.001	mg/L	< 0.001

Client Sample ID			SWMP
Sample Matrix			Water
Eurofins Sample No.			M22-Ap0029612
Date Sampled			Apr 12, 2022
Test/Reference	LOR	Unit	
Polycyclic Aromatic Hydrocarbons			
Naphthalene	0.001	mg/L	< 0.001
Phenanthrene	0.001	mg/L	< 0.001
Pyrene	0.001	mg/L	< 0.001
Total PAH*	0.001	mg/L	< 0.001
2-Fluorobiphenyl (surr.)	1	%	104
p-Terphenyl-d14 (surr.)	1	%	103
Glycols*			
Di-Ethylene Glycol*	20	mg/L	< 20
Ethylene glycol*	20	mg/L	< 20
Propylene glycol*	20	mg/L	< 20
Triethylene glycol*	20	mg/L	< 20
Polychlorinated Biphenyls			
Aroclor-1016	0.005	mg/L	< 0.005
Aroclor-1221	0.005	mg/L	< 0.005
Aroclor-1232	0.005	mg/L	< 0.005
Aroclor-1242	0.005	mg/L	< 0.005
Aroclor-1248	0.005	mg/L	< 0.005
Aroclor-1254	0.005	mg/L	< 0.005
Aroclor-1260	0.005	mg/L	< 0.005
Total PCB*	0.005	mg/L	< 0.005
Dibutylchloroendate (surr.)	1	%	54
Tetrachloro-m-xylene (surr.)	1	%	141
Phenols (Halogenated)			
2-Chlorophenol	0.003	mg/L	< 0.003
2,4-Dichlorophenol	0.003	mg/L	< 0.003
2,4,5-Trichlorophenol	0.01	mg/L	< 0.01
2,4,6-Trichlorophenol	0.01	mg/L	< 0.01
2,6-Dichlorophenol	0.003	mg/L	< 0.003
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01
Pentachlorophenol	0.01	mg/L	< 0.01
Tetrachlorophenols - Total	0.03	mg/L	< 0.03
Total Halogenated Phenol*	0.01	mg/L	< 0.01
Phenols (non-Halogenated)			
2-Cyclohexyl-4,6-dinitrophenol	0.1	mg/L	< 0.1
2-Methyl-4,6-dinitrophenol	0.03	mg/L	< 0.03
2-Nitrophenol	0.01	mg/L	< 0.01
2,4-Dimethylphenol	0.003	mg/L	< 0.003
2,4-Dinitrophenol	0.03	mg/L	< 0.03
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006
Total cresols*	0.01	mg/L	< 0.01
4-Nitrophenol	0.03	mg/L	< 0.03
Dinoseb	0.1	mg/L	< 0.1
Phenol	0.003	mg/L	< 0.003
Phenol-d6 (surr.)	1	%	55
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1

Client Sample ID			SWMP
Sample Matrix			Water
Eurofins Sample No.			M22- Ap0029612
Date Sampled			Apr 12, 2022
Test/Reference	LOR	Unit	
Ammonia (as N)	0.01	mg/L	< 0.01
Chloride	1	mg/L	85
Cyanide (total)	0.005	mg/L	< 0.005
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05
Nitrate (as N)	0.02	mg/L	< 0.02
Nitrite (as N)	0.02	mg/L	< 0.02
Organic Nitrogen (as N)*	0.2	mg/L	3
Phosphate total (as P)	0.01	mg/L	0.03
Sulphate (as SO ₄)	5	mg/L	< 5
Total Dissolved Solids Dried at 180°C ± 2°C	10	mg/L	440
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	3.0
Total Nitrogen (as N)*	0.2	mg/L	3
Total Suspended Solids Dried at 103°C–105°C	5	mg/L	28
Alkalinity (speciated)			
Bicarbonate Alkalinity (as CaCO ₃)	20	mg/L	82
Carbonate Alkalinity (as CaCO ₃)	10	mg/L	< 10
Hydroxide Alkalinity (as CaCO ₃)	20	mg/L	< 20
Total Alkalinity (as CaCO ₃)	20	mg/L	82
Heavy Metals			
Antimony	0.005	mg/L	< 0.005
Antimony (filtered)	0.005	mg/L	< 0.005
Arsenic	0.001	mg/L	0.008
Arsenic (filtered)	0.001	mg/L	0.004
Barium	0.02	mg/L	0.33
Barium (filtered)	0.02	mg/L	0.26
Beryllium	0.001	mg/L	< 0.001
Beryllium (filtered)	0.001	mg/L	< 0.001
Boron	0.05	mg/L	< 1
Boron (filtered)	0.05	mg/L	< 1
Cadmium	0.0002	mg/L	< 0.0002
Cadmium (filtered)	0.0002	mg/L	< 0.0002
Chromium	0.001	mg/L	0.005
Chromium (filtered)	0.001	mg/L	0.003
Cobalt	0.001	mg/L	0.004
Cobalt (filtered)	0.001	mg/L	0.003
Copper	0.001	mg/L	0.003
Copper (filtered)	0.001	mg/L	0.001
Lead	0.001	mg/L	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001
Manganese	0.005	mg/L	0.45
Manganese (filtered)	0.005	mg/L	0.34
Mercury	0.0001	mg/L	< 0.0001
Mercury (filtered)	0.0001	mg/L	< 0.0001
Nickel	0.001	mg/L	0.024
Nickel (filtered)	0.001	mg/L	0.018
Selenium	0.001	mg/L	< 0.001
Selenium (filtered)	0.001	mg/L	< 0.001
Vanadium	0.005	mg/L	< 0.005
Vanadium (filtered)	0.005	mg/L	< 0.005

Client Sample ID			SWMP
Sample Matrix			Water
Eurofins Sample No.			M22-Ap0029612
Date Sampled			Apr 12, 2022
Test/Reference	LOR	Unit	
Heavy Metals			
Zinc	0.005	mg/L	2.8
Zinc (filtered)	0.005	mg/L	2.1
Alkali Metals			
Calcium	0.5	mg/L	17
Magnesium	0.5	mg/L	1.1
Potassium	0.5	mg/L	4.8
Sodium	0.5	mg/L	40
Perfluoroalkyl carboxylic acids (PFCAs)			
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	< 0.05
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	0.05
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	0.05
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.01	ug/L	^{N09} 0.01
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	< 0.01
Perfluorononanoic acid (PFNA) ^{N11}	0.01	ug/L	< 0.01
Perfluorodecanoic acid (PFDA) ^{N11}	0.01	ug/L	< 0.01
Perfluoroundecanoic acid (PFUnDA) ^{N11}	0.01	ug/L	< 0.01
Perfluorododecanoic acid (PFDoDA) ^{N11}	0.01	ug/L	< 0.01
Perfluorotridecanoic acid (PFTeDA) ^{N15}	0.01	ug/L	< 0.01
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	0.01	ug/L	< 0.01
13C4-PFBA (surr.)	1	%	107
13C5-PFPeA (surr.)	1	%	107
13C5-PFHxA (surr.)	1	%	133
13C4-PFHpA (surr.)	1	%	141
13C8-PFOA (surr.)	1	%	136
13C5-PFNA (surr.)	1	%	128
13C6-PFDA (surr.)	1	%	121
13C2-PFUnDA (surr.)	1	%	119
13C2-PFDoDA (surr.)	1	%	101
13C2-PFTeDA (surr.)	1	%	128
Perfluoroalkyl sulfonamido substances			
Perfluorooctane sulfonamide (FOSA) ^{N11}	0.05	ug/L	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	0.05	ug/L	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	0.05	ug/L	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE) ^{N11}	0.05	ug/L	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE) ^{N11}	0.05	ug/L	< 0.05
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	0.05	ug/L	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	0.05	ug/L	< 0.05
13C8-FOSA (surr.)	1	%	109
D3-N-MeFOSA (surr.)	1	%	133
D5-N-EtFOSA (surr.)	1	%	92
D7-N-MeFOSE (surr.)	1	%	95
D9-N-EtFOSE (surr.)	1	%	118
D5-N-EtFOSAA (surr.)	1	%	60
D3-N-MeFOSAA (surr.)	1	%	67

Client Sample ID			SWMP
Sample Matrix			Water
Eurofins Sample No.			M22- Ap0029612
Date Sampled			Apr 12, 2022
Test/Reference	LOR	Unit	
Perfluoroalkyl sulfonic acids (PFASs)			
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	< 0.01
Perfluorononanesulfonic acid (PFNS) ^{N15}	0.01	ug/L	< 0.01
Perfluoropropanesulfonic acid (PFPrS) ^{N15}	0.01	ug/L	< 0.01
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.01	ug/L	< 0.01
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	< 0.01
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	< 0.01
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	< 0.01
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 0.01
13C3-PFBS (surr.)	1	%	107
18O2-PFHxS (surr.)	1	%	129
13C8-PFOS (surr.)	1	%	97
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	0.01	ug/L	< 0.01
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA) ^{N11}	0.05	ug/L	0.23
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	0.01	ug/L	< 0.01
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	0.01	ug/L	< 0.01
13C2-4:2 FTSA (surr.)	1	%	87
13C2-6:2 FTSA (surr.)	1	%	72
13C2-8:2 FTSA (surr.)	1	%	102
13C2-10:2 FTSA (surr.)	1	%	119
PFASs Summations			
Sum (PFHxS + PFOS)*	0.01	ug/L	< 0.01
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	< 0.01
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	< 0.01
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	0.34
Sum of PFASs (n=30)*	0.1	ug/L	0.34

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B4A			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Apr 14, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Apr 14, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Apr 14, 2022	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	Apr 14, 2022	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
Polycyclic Aromatic Hydrocarbons	Melbourne	Apr 14, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (Halogenated)	Melbourne	Apr 14, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Phenols (non-Halogenated)	Melbourne	Apr 14, 2022	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Glycols*	Melbourne	Apr 14, 2022	7 Days
- Method: GLYCOLS- US EPA SW846 METHOD 8000 GC-FID.			
Polychlorinated Biphenyls	Melbourne	Apr 14, 2022	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8082)			
Cyanide (total)	Melbourne	Apr 14, 2022	14 Days
- Method: LTM-INO-4020 Total Free WAD Cyanide by CFA			
Total Suspended Solids Dried at 103°C–105°C	Melbourne	Apr 14, 2022	7 Days
- Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry			
Heavy Metals	Melbourne	Apr 14, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals (filtered)	Melbourne	Apr 14, 2022	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Mobil Metals : Metals M15	Melbourne	Apr 14, 2022	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Eurofins Suite B11C: Na/K/Ca/Mg	Melbourne	Apr 14, 2022	180 Days
- Method: LTM-MET-3010 Alkali Metals by ICP-AES			
Nitrogens (speciated)			
Ammonia (as N)	Melbourne	Apr 22, 2022	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Nitrate & Nitrite (as N)	Melbourne	Apr 22, 2022	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Nitrate (as N)	Melbourne	Apr 22, 2022	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Nitrite (as N)	Melbourne	Apr 22, 2022	2 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Organic Nitrogen (as N)*	Melbourne	Apr 13, 2022	7 Days
- Method: APHA 4500 Organic Nitrogen (N)			
Total Kjeldahl Nitrogen (as N)	Melbourne	Apr 14, 2022	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Eurofins Suite B11E: Cl/SO4/Alkalinity			
Chloride	Melbourne	Apr 14, 2022	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
Sulphate (as SO4)	Melbourne	Apr 14, 2022	28 Days
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
Alkalinity (speciated)	Melbourne	Apr 14, 2022	14 Days
- Method: LTM-INO-4250 Alkalinity by Electrometric Titration			

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B19A: Total N (TKN, NOx), Total P			
Phosphate total (as P)	Melbourne	Apr 14, 2022	28 Days
- Method: LTM-INO-4040 Phosphate by CFA			
Total Dissolved Solids Dried at 180°C ± 2°C	Melbourne	Apr 14, 2022	28 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			
Per- and Polyfluoroalkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs)	Melbourne	Apr 14, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Melbourne	Apr 14, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAs)	Melbourne	Apr 14, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Melbourne	Apr 14, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
PFASs Summations	Melbourne	Apr 13, 2022	
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

Company Name:	Global Resource Recovery Pty Ltd	Order No.:	GRR DARWIN	Received:	Apr 13, 2022 12:00 PM
Address:	9-11 Maria Street Laverton North VIC 3026	Report #:	880056	Due:	Apr 22, 2022
		Phone:	03 9369 4545	Priority:	5 Day
		Fax:		Contact Name:	Darwin Operation
Project Name:	GLOBAL RESOURCE RECOVERY				
Project ID:	PROCESSING DWN				

Eurofins Analytical Services Manager : Michael Morrison

Sample Detail						Eurofins Suite B11.C: Na/K/Ca/Mg		Per- and Polyfluoroalkyl Substances (PFASs)		Eurofins Suite B11.E: Cl/SO4/Alkalinity		Eurofins Suite B19A: Total N (TKN, NOx)		Eurofins Suite B4A		Nitrogens (Speciated)		Polychlorinated Biphenyls		Glycols*		Zinc (filtered)		Zinc		Vanadium (filtered)		Vanadium		Total Suspended Solids Dried at		Selenium (filtered)		Selenium		Nickel (filtered)		Nickel		Mercury (filtered)		Mercury		Manganese (filtered)		Manganese		Lead (filtered)		Lead		Cyanide (total)		Copper (filtered)		Copper		Cobalt (filtered)		Cobalt		Chromium (filtered)		Chromium		Cadmium (filtered)		Cadmium		Boron (filtered)		Boron		Beryllium (filtered)		Beryllium		Barium (filtered)		Barium		Arsenic (filtered)		Arsenic		Antimony (filtered)		Antimony																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	µg/L: micrograms per litre
ppm: parts per million	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Comments

Quality Control Results were not displayed on the request of the client

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
N09	Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).

Authorised by:

Michael Morrison	Analytical Services Manager
Harry Bacalis	Senior Analyst (NSW)
Joseph Edouard	Senior Analyst (VIC)
Mary Makarios	Senior Analyst (NSW)
Caitlin Breeze	Senior Analyst (VIC)



Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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Appendix H Surface Water Data 2021/2022

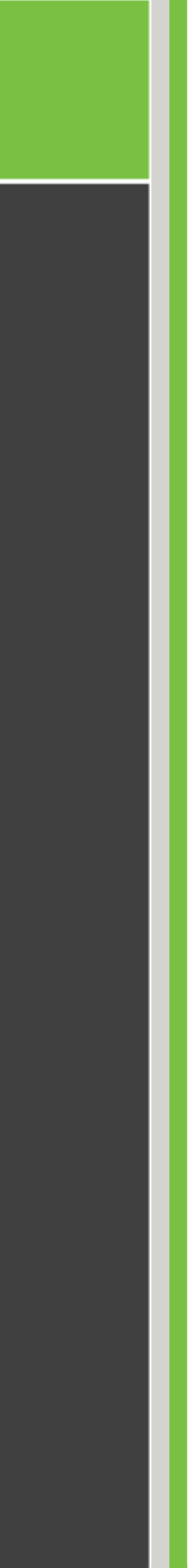
Darwin - EPL229-01 - Monthly Surface Water Monitoring Results

PARAMETER	UNITS	LoR	Default Guideline Value	FREQUENCY	Oct-21	Nov-21	Dec-21	Dec-21	Jan-22	Feb-22	Feb-22	Mar-22	Mar-22	Apr-22
					Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point
Sample Date					5/10/21	23/11/21	2/12/21	13/12/21	12/01/22	9/02/22	22/2/2022	15/3/2022	25/3/2022	12-April-2022
Report Number					M21-Oc11768	M21-No56864	M21-De08242	M21-De35974	M22-Ja10591	M22-Fe17465	M22-Fe43999	M22-Ma28248	M22-Ma53384	M22-Ap29612
					830099-W	843681-W	846711-W	850410-W	855435-W		865419-W	871134-W	874391-W	880056-W
Name of person collecting sample					Sue McW	Sue McW			Sue McW	Sue McW	Sue McW	Sue McW		Sue McW
Discharge?														
Alkali Metals														
Calcium	mg/L	0.5	-	Monthly	470	76	9.2	31	27	14	15	9.9	12	17
Magnesium	mg/L	0.5	-	Monthly	20	<5	0.9	0.7	<5	1.2	1	0.5	<5	1.1
Sodium	mg/L	0.5	-	Monthly	510	93	19	44	63	57	33	20	43	4.8
Potassium	mg/L	0.5	-	Monthly	29	6.4	1.9	3.6	<5	5.3	6.2	2.1	<5	40
Chloride	mg/L	1	-	Monthly	600	78	33	41	66	57	51	20	50	85
Sulphate	mg/L	5	-	Monthly	41	<5	<5	<5	<5	<5	<5	<5	<5	<5
Alkalinity (speciated)														
Bicarbonate	mg/L	20	-	Monthly	560	240	150	<20	41	110	180	38	110	82
Carbonate	mg/L	10	-	Monthly	<10	<20	<20	<10	<10	<10	<10	<20	<20	<10
Hydroxide Alkalinity	mg/L	20	-	Monthly	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Total Alkalinity	mg/L	20	-	Monthly	560	240	150	<20	41	110	180	38	110	82
Nutrients														
Ammonia (as N)	µg/L	10	20	Monthly	600	<50	<50	<50	2600	1200	50	<50	<50	<1
Total Cyanide	µg/L	5	-	Monthly	<5	<10	<10	<5	<5	<5	<5	<10	<10	<10
Nitrate & Nitrite (as N)	µg/L	50	20	Monthly	<50	<250	<250	<50	<250	<50	<250	<50	<50	<50
Nitrate (as N)	µg/L	20	-	Monthly	-	-	-	-	-	-	-	-	-	<20
Nitrite (as N)	µg/L	20	-	Monthly	-	-	-	-	-	-	-	-	-	<20
Organic Nitrogen (as N)*	µg/L	200	-	Monthly	-	-	-	-	-	-	-	-	-	3000
Total Phosphorous	µg/L	10	20	Monthly	2400	240	70	250	280	<100	50	70	80	30
Total Kjeldahl Nitrogen (as N)	µg/L	200	270	Monthly	3300	2300	2000	400	2200	1700	1200	400	690	3000
Total Nitrogen	µg/L	200	-	Monthly	3300	2300	2000	400	2200	1700	1200	400	690	3000
Metals and Metalloids														
Anitmony	µg/L	5	270	Monthly	<50	<50	<50	<5	<5	5	<5	<50	<50	<5
Anitmony (filtered)	µg/L	5	270	Monthly	<50	<50	<5	<5	<5	<5	<5	<50	<10	<5
Arsenic	µg/L	1	4.5	Monthly	11	10	<10	6	10	3	13	<100	<10	8
Arsenic (filtered)	µg/L	1	4.5	Monthly	<10	<10	<1	4	4	2	7	<10	<10	4
Barium	µg/L	20	-	Monthly	1500	620	90	280	390	360	490	130	410	330
Barium (filtered)	µg/L	20	-	Monthly	1400	90	80	320	320	350	490	140	430	260
Beryllium	µg/L	1	-	Monthly	<10	<10	<10	<1	<1	<1	<1	<10	<10	<1
Beryllium (filtered)	µg/L	1	-	Monthly	<10	<10	<1	<1	<1	<1	<1	<10	<10	<1
Boron	µg/L	50	5100	Monthly	3500	990	80	<500	140	<0.2	-	<50	<1000	<1000
Boron (filtered)	µg/L	50	5100	Monthly	3200	730	<50	420	90	<0.2	-	<50	<1000	<1000
Cadmium	µg/L	0.2	5.5	Monthly	<2	<2	<1	<0.2	<0.2	<1	<0.2	<0.2	<1	<0.2
Cadmium (filtered)	µg/L	0.2	5.5	Monthly	<2	<2	<0.2	<0.2	<0.2	<1	<0.2	<0.2	<1	<0.2
Chromium IV	µg/L	1	4.4	Monthly	21	<10	<10	1	1	2	3	<10	<10	5
Chromium IV (filtered)	µg/L	1	4.4	Monthly	17	<10	<1	<1	<1	<1	<1	<10	<10	3

PARAMETER	UNITS	LoR	Default Guideline Value	FREQUENCY	Oct-21	Nov-21	Dec-21	Dec-21	Jan-22	Feb-22	Feb-22	Mar-22	Mar-22	Apr-22
					Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point
Sample Date					5/10/21	23/11/21	2/12/21	13/12/21	12/01/22	9/02/22	22/2/2022	15/3/2022	25/3/2022	12-April-2022
Report Number					M21-Oc11768	M21-No56864	M21-De08242	M21-De35974	M22-Ja10591	M22-Fe17465	M22-Fe43999	M22-Ma28248	M22-Ma53384	M22-Ap29612
					830099-W	843681-W	846711-W	850410-W	855435-W		865419-W	871134-W	874391-W	880056-W
Name of person collecting sample					Sue McW	Sue McW			Sue McW	Sue McW	Sue McW	Sue McW		Sue McW
Discharge?														
Cobalt	µg/L	1	1	Monthly	23	<10	<10	3	5	-	3	<10	<10	4
Cobalt (filtered)	µg/L	1	1	Monthly	23	<10	<1	3	-	-	3	<10	<10	3
Copper	µg/L	1	1.3	Monthly	<50	<10	<10	<1	5	2	6	<10	<10	3
Copper (filtered)	µg/L	1	1.3	Monthly	<50	<10	<1	<1	<1	<1	<1	<10	<10	1
Lead	µg/L	1	4.4	Monthly	10	<10	<10	1	2	<1	1	<10	<10	<1
Lead (filtered)	µg/L	1	4.4	Monthly	<10	<10	<1	<1	<1	<1	<1	<10	<10	<1
Manganese	µg/L	5	80	Monthly	6100	1400	150	440	670	510	510	130	460	450
Manganese (filtered)	µg/L	5	80	Monthly	6000	930	130	490	640	510	500	120	490	340
Mercury (inorganic)	µg/L	0.1	0.4	Monthly	2.6	<1	<1	<0.1	<0.1	<0.1	<0.1	<1	<1	<0.1
Mercury (inorganic) (filtered)	µg/L	0.1	0.4	Monthly	1.6	<1	<1	<0.1	<0.1	<0.1	<0.1	<1	<1	<0.1
Nickel	µg/L	1	70	Monthly	130	20	<10	11	13	10	12	<10	<10	24
Nickel (filtered)	µg/L	1	70	Monthly	120	23	6	12	13	10	10	<10	50	18
Selenium	µg/L	1	3	Monthly	11	<50	<50	2	15	<1	<1	<50	<50	<1
Selenium (filtered)	µg/L	1	3	Monthly	<10	<10	<1	2	<1	<1	<1	<10	<10	<1
Vanadium	µg/L	5	100	Monthly	<50	<50	<50	<5	<5	<5	6	<50	<50	<5
Vanadium (filtered)	µg/L	5	100	Monthly	<50	<50	<5	<5	<5	<5	<5	<50	<50	<5
Zinc	µg/L	5	15	Monthly	6700	8900	1200	7000	5200	870	1600	570	170	2800
Zinc (filtered)	µg/L	5	15	Monthly	6500	5300	1200	6200	4900	530	1600	450	140	2100
Hydrocarbons														
Benzene	µg/L	1	700	Monthly	<100	<100	<100	<100	<5	<100	<100	<100	<1	<100
Toluene	µg/L	1	180	Monthly	<100	<100	<100	<100	<5	<100	<100	<100	1	<100
Ethylbenzene	µg/L	1	-	Monthly	<100	<100	<100	<100	<5	<100	<100	<100	<1	<100
m&p-Xylenes	µg/L	2	-	Monthly	<200	<200	<200	<200	<10	<200	<200	<200	<2	<200
o-Xylene	µg/L	1	-	Monthly	<100	<100	<100	<100	<5	<100	<100	<100	<1	<100
Xylenes - Total*	µg/L	3	-	Monthly	<300	<300	<300	<300	<15	<300	<300	<300	<3	<300
Total Recoverable Hydrocarbons (TRH)														
TRH C6-C9	µg/L	20	-	Monthly	<2000	<2000	<2000	<2000	<1000	<2000	<2000	<2000	<20	<2000
TRH C10-C14	µg/L	50	-	Monthly	40000	5400	170	2700	<50	240	1400	340	840	70
TRH C15-C28	µg/L	100	-	Monthly	9800	2500	400	800	<100	500	900	2100	800	200
TRH C29-C36	µg/L	100	-	Monthly	2000	1400	300	500	<100	300	500	1400	200	100
TRH C10-C36 (Total)	µg/L	100	-	Monthly	51800	9300	870	4000	<100	1040	2800	3840	1840	370
Naphthalene	µg/L	10	70	Monthly	<1000	<1000	<1000	<1000	<50	<1000	<1000	<1000	<10	<1000
TRH C6-C10	µg/L	20	-	Monthly	<2000	<2000	<2000	<2000	<100	<2000	<2000	<2000	<20	<2000
TRH C6-C10 less BTEX (F1)	µg/L	20	-	Monthly	<2000	<2000	<2000	<2000	<100	<2000	<2000	<2000	<20	<2000
TRH >C10-C16	µg/L	50	-	Monthly	3500	3300	150	2000	<50	240	1100	480	860	70
TRH >C10-C16 less Naphthalene (F2)	µg/L	50	-	Monthly	3500	3300	<1000	2000	<50	<1000	1100	<1000	860	<1000
TRH >C16-C34	µg/L	100	-	Monthly	9100	3300	500	1000	<100	600	1200	3000	800	300
TRH >C34-C40	µg/L	100	-	Monthly	800	600	100	200	<100	100	200	600	100	<100
TRH >C10-C40 (total)*	µg/L	100	-	Monthly	44900	7200	750	3200	<100	940	2500	4080	1760	370
Other														

PARAMETER	UNITS	LoR	Default Guideline Value	FREQUENCY	Oct-21	Nov-21	Dec-21	Dec-21	Jan-22	Feb-22	Feb-22	Mar-22	Mar-22	Apr-22
					Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point	Storm Water Holding Pit & Monitoring Point
Sample Date					5/10/21	23/11/21	2/12/21	13/12/21	12/01/22	9/02/22	22/2/2022	15/3/2022	25/3/2022	12-April-2022
Report Number					M21-Oct11768	M21-No56864	M21-De08242	M21-De35974	M22-Ja10591	M22-Fe17465	M22-Fe43999	M22-Ma28248	M22-Ma53384	M22-Ap29612
					830099-W	843681-W	846711-W	850410-W	855435-W		865419-W	871134-W	874391-W	880056-W
Name of person collecting sample					Sue McW	Sue McW			Sue McW	Sue McW	Sue McW	Sue McW		Sue McW
Discharge?														
PFOS	µg/L	0.01	0.13	Monthly	<50	0.55	0.16	0.13	0.11	0.22	0.06	0.04	0.9	<0.01
PFAS	µg/L	0.1	220	Monthly	1.17	1.378	0.42	0.48	0.32	2.1	0.56	0.24	0.96	0.34
Total Dissolved Solids (TDS)	mg/L	10	-	Monthly	3300	650	190	450	420	300	340	64	280	440
Total Suspended Solids (TSS)	mg/L	5	10	Monthly	29	37	31	9.1	20	28	7.6	24	21	28
Polcyclic Aromatic Hydrocarbons														
Acenaphthene	µg/L	1	-	Monthly	<1	<1	<1	<1	-	<1	<1	<1	<1	<1
Acenaphthylene	µg/L	1	-	Monthly	<1	<1	<1	<1	-	<1	<1	<1	<1	<1
Anthracene	µg/L	1	-	Monthly	<1	<1	<1	<1	-	<1	<1	<1	<1	<1
Benz(a)anthracene	µg/L	1	-	Monthly	<1	<1	<1	<1	-	<1	<1	<1	<1	<1
Benzo(a)pyrene	µg/L	1	-	Monthly	<1	<1	<1	<1	-	<1	<1	<1	<1	<1
Benzo(b&j)fluoranthene	µg/L	1	-	Monthly	<1	<1	<1	<1	-	<1	<1	<1	<1	<1
Benzo(g,h,i)perylene	µg/L	1	-	Monthly	<1	<1	<1	<1	-	<1	<1	<1	<1	<1
Benzo(k)fluoranthene	µg/L	1	-	Monthly	<1	<1	<1	<1	-	<1	<1	<1	<1	<1
Chrysene	µg/L	1	-	Monthly	<1	<1	<1	<1	-	<1	<1	<1	<1	<1
Dibenz(a,h)anthracene	µg/L	1	-	Monthly	<1	<1	<1	<1	-	<1	<1	<1	<1	<1
Fluoranthene	µg/L	1	-	Monthly	<1	<1	<1	<1	-	<1	<1	<1	<1	<1
Fluorene	µg/L	1	-	Monthly	<1	<1	<1	<1	-	<1	<1	<1	<1	<1
Indeno(1.2.3-cd)pyrene	µg/L	1	-	Monthly	<1	<1	<1	<1	-	<1	<1	<1	<1	<1
Naphthalene	µg/L	1	70	Monthly	4	<1	<1	<1	-	<1	<1	<1	<1	<1
Phenanthrene	µg/L	1	-	Monthly	<1	<1	<1	<1	-	<1	<1	<1	<1	<1
Pyrene	µg/L	1	-	Monthly	<1	<1	<1	<1	-	<1	<1	<1	<1	<1
Total PAH*	µg/L	1	-	Monthly	4	<1	<1	<1	-	<1	<1	<1	<1	<1
Glycols														
Di-Ethylene Glycol*	µg/L	20000	-	Monthly	<200000	<20000	<20000	<20000	<20000	<20000	<20000	<20000	<20000	<20000
Ethylene glycol*	µg/L	20000	-	Monthly	8500000	<20000	79000	1400000	28000	38000	100000	<20000	<20000	<20000
Propylene glycol*	µg/L	20000	-	Monthly	<200000	<20000	<20000	<20000	<20000	37000	<20000	<20000	<20000	<20000
Triethylene Glycol	µg/L	20000	-	Monthly	<200000	<20000	<20000	<20000	<20000	<20000	<20000	<20000	<20000	<20000
Polychlorinated Biphenyls (PCBs)														
Total PCB*	µg/L	5	-	Monthly	<5	<5	<5	<5	<5	0	<5	<5	<5	<5
Phenols Halogenated														
2-Chlorophenol	µg/L	3	-	Monthly	<3	<3	<3	<3	-	<3	<3	<3	<3	<3
2,4-Dichlorophenol	µg/L	3	-	Monthly	<3	<3	<3	<3	-	<3	<3	<3	<3	<3
2,4,5-Trichlorophenol	µg/L	10	-	Monthly	<30	<30	<30	<30	-	<30	<30	<30	<30	<30
2,4,6-Trichlorophenol	µg/L	10	-	Monthly	<30	<30	<30	<30	-	<30	<30	<30	<30	<30
2,6-Dichlorophenol	µg/L	3	-	Monthly	<3	<3	<3	<3	-	<3	<3	<3	<3	<3
4-Chloro-3-methylphenol	µg/L	10	-	Monthly	<10	<10	<10	<10	-	<10	<10	<10	<10	<10
Pentachlorophenol	µg/L	10	-	Monthly	<10	<10	<10	<10	-	<10	<10	<10	<10	<10
Tetrachlorophenols - Total	µg/L	30	-	Monthly	<30	<30	<30	<30	-	<30	<30	<30	<30	<30
Total Halogenated Phenol*	µg/L	10	400	Monthly	<10	<10	<10	<10	-	<10	<10	<10	<10	<10
Phenols Non Halogenated														

[illegible]



Appendix I Assured Environmental Source Emissions Report

27th May 2022

CC Reference: RCC22021

Global Resource Recovery
800 Berimah Road, East Arm,
Northern Territory, 0822 Australia

Attention: James Macdonald

As requested, the Global Resource Recovery facility in East Arm was tested for compliance requirements performed on the 27th and 28th April 2022 conducted by Assured Monitoring Group. Please refer to the attached Report Project ID is 14233.

Air emission testing results on both the Boiler and Vent Stacks demonstrate that the emissions do not exceed any licence criteria.

If you require any further information please feel free to contact the undersigned on 0412194825 or carmelo@cconsulting.net.au.

Kind Regards,



Carmelo Chiappalone
Principal Consultant



ASSURED ENVIRONMENTAL PTY LTD

Your environmental compliance partner



APRIL 2022

**SOURCE EMISSIONS MONITORING –
GLOBAL RESOURCE RECOVERY**

**CLIENT: CHIAPPALONE CONSULTING
(ON BEHALF OF GLOBAL RESOURCE RECOVERY)**

PROJECT ID: 14233

DATE: 27/05/2022 RELEASE: R_O

DOCUMENT CONTROL PAGE

Project Title: Source Emissions Monitoring – Global Resource Recovery

Project Reference ID: 14233

Report Prepared by:

Assured Environmental

Unit 7, 142 Tennyson Memorial Avenue

Tennyson, QLD, 4105

ABN: 87 604 851 078

Report Prepared for:

Chiappalone Consulting

on behalf of Global Resource Recovery

800 Berrimah Road

East Arm NT 0822



Report Author: Timon Berger



Report Reviewer: Adam Dixon

Table 1: History of Revisions

Revision	Date	Issued to	Changes
R_0	27/05/2022	C. Chiappalone	Formal report release.
DRAFT_0	24/05/2022	C. Chiappalone	Draft release for comment.

ACCREDITED FOR COMPLIANCE TO ISO/IEC 17025 (TESTING)

The results of the tests, calibrations and/or measurements included in this document is traceable to Australian/national standards.

Accreditation number: 19703



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EXECUTIVE SUMMARY

Assured Environmental (AE) conducted source emissions monitoring at the Global Resource Recovery facility in East Arm, Darwin on 27th and 28th April 2022.

A summary of results and comparison against compliance levels is presented in Table 2 and Table 3 below from the testing conducted on the boiler stack and combined vent scrubber stack release points. The process is understood to have been operating at a stable and representative load for the duration of the monitoring.

In comparison to the emission limits, all measured parameters were within those limits specified. Results are reported at dry, 273.15°K and 101.325 kPa (STP).

Table 2: Summary of measured parameters – Boiler

Parameter	Test 1 Boiler Stack	Test 2 Boiler Stack	Emission limit	Unit	Reference
Sample dates	28/04/2022	28/04/2022		dd.mm.yyyy	-
Average source temperature	105	108	-	°C	-
Flue gas water vapour content	8.5	8.5	-	vol-%	-
Carbon dioxide concentration	3.0	3.0	-	vol-%	STP - dry
Oxygen concentration	15.8	15.8	-	vol-%	STP - dry
Flue gas density - dry	1.3	1.3	-	kg/Nm ³	STP - dry
Flue gas velocity	5.0	5.1	-	m/sec	STP - dry
Flue gas volume flow	76.7	76.4	-	Nm ³ /min	STP - dry
Particulate matter	< 1.4	< 1.5	50	mg/Nm ³	STP - dry
- emission rate	< 0.11	< 0.12	-	g/min	
Oxides of nitrogen (as NO ₂)	25	25	350	mg/Nm ³	STP - dry
- at 7% O ₂	69	69	-	mg/Nm ³	
- emission rate	1.9	1.9	-	g/min	
Carbon monoxide	11	11	125	mg/Nm ³	STP - dry
- emission rate	0.84	0.84	-	g/min	
Total heavy metals [1]	< 0.051	< 0.041	1.0	mg/Nm ³	STP - dry
- emission rate	< 3.9	< 3.1	-	mg/min	
Cadmium	0.0021	0.00044	0.2	mg/Nm ³	STP - dry
- emission rate	0.16	0.034	-	mg/min	
Mercury	0.000069	0.000044	0.2	mg/Nm ³	STP - dry
- emission rate	0.0053	0.0034	-	mg/min	
Hydrogen chloride	< 0.7	< 0.8	100	mg/Nm ³	STP - dry
- emission rate	< 0.054	< 0.058	-	g/min	
Sulfur dioxide	< 3	< 3	150	mg/Nm ³	STP - dry
- emission rate	< 0.2	< 0.2	-	g/min	
Total VOCs (as n-propane)	< 0.8	< 0.8	40	mg/Nm ³	STP - dry
- emission rate	< 0.06	< 0.06	-	g/min	

[1] Sum of Sb, As, Cd, Pb, Hg, Be, Cr, Co, Mn, Ni, Se, Sn, V.

Table 3: Summary of measured parameters – Scrubber vent

Parameter	Test 1 Vent Stack	Test 2 Vent Stack	Emission limit	Unit	Reference
Sample dates	27/04/2022	27/04/2022		dd.mm.yyyy	-
Average source temperature	37	37	-	°C	-
Flue gas water vapour content	6	6	-	vol-%	-
Carbon dioxide concentration	0.0	0.0	-	vol-%	STP - dry
Oxygen concentration	20.8	20.8	-	vol-%	STP - dry
Flue gas density - dry	1.3	1.3	-	kg/Nm ³	STP - dry
Flue gas velocity	< 1.1	< 1.1	-	m/sec	STP - dry
Flue gas volume flow	< 0.3	< 0.3	-	Nm ³ /min	STP - dry
Total VOCs (as n-propane)	< 1.1	< 1.2	40	mg/Nm ³	STP - dry
- emission rate	< 0.0003	< 0.0003	-	g/min	STP - dry

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1 INTRODUCTION

Assured Environmental (AE) was appointed by Chiappalone Consulting to sample and analyse source emissions at the Smorgon Fuels Global Resource Recovery facility in East Arm, Darwin. Sampling was conducted on the combined vent scrubber stack and the gas fired boiler stack by AE on 27th and 28th April 2022 during typical site operations.

AE was responsible for the collection and analysis of samples, unless otherwise indicated. The samples were recovered and stored in the appropriate manner until their return to the laboratory where the samples were prepared and analysed according to the methodologies listed below in this report.

2 METHODOLOGY & EQUIPMENT

2.1 Sampling methodology

All sampling and analysis was carried out in accordance with the listed requirements in Table 4. Any specific comments about the sampling and analysis have been documented where required.

Table 4: Test methods

Parameter	Reference Test Method	Test Method (NSW)	NATA accreditation	Analysis by
Sample location	AS4323.1	TM-1	Yes	1
Velocity & flow rate	USEPA Method 2	TM-2	Yes	1
Stack gas density	USEPA Method 3	TM-23	Yes	1
Oxygen	USEPA Method 3A	TM-25	Yes	1
Carbon dioxide	USEPA Method 3A	TM-24	Yes	1
Water vapour content	USEPA Method 4	TM-22	Yes	1
Total solid particulates	AS 4323.2	TM-15	Yes	1
Sulphur dioxide	USEPA Method 6C	TM-4	Yes	1
Oxides of nitrogen (as NO ₂)	USEPA Method 7E	TM-11	Yes	1
Carbon monoxide	USEPA Method 10	TM-32	Yes	1
Volatile organic compounds	USEPA Method 18	TM-34	Yes	2
Hydrogen chloride	USEPA Method 26A	TM-8	Yes	2
Heavy metals	USEPA Method 29	TM-12/13/14	Yes	2

Table 5: Analysis performed by

Note	Company	Work performed	NATA ID	Report Number
1	Assured Environmental	Sampling & analysis	19703	14233
2	Envirolab Services	Sample analysis	2901	294690 281189

Table 6: Sampling comments

Note	Comment
Sample location	Boiler – Sample location is compliant but non ideal as per AS4323.1. The sample location is greater than two, but less than six diameters downstream from a disturbance. The temperature and velocity survey showed that the sample position was in compliance to items (a) to (f) as per AS4323.1. Vent stack – Sample location is non-compliant, the gas flow is below the limit of detection. The instrumentation was unable to detect the differential pressure within the duct, therefore the results have been reported at the detection limit, which is considered a conservative result.
Calibrations	Analyser calibration performed in the laboratory prior to conducting field work and post field work in AE lab.
Heavy metals	Sum of Antimony, Arsenic, Lead, Chromium, Beryllium, Selenium, Manganese, Nickel and Cobalt.
VOCs	Volatile organic compounds were sampled using the constant flow sample method USEPA 18. A sample for flue gas was passed at a known flow rate through a condensate removal trap and activated carbon tube. Both the condensate and tube are recovered in the laboratory and analysed for VOCs via GC-MS. The total VOC test result integrates all detectable peaks in the sample to a reference compound, in this case hexane. Results are then reported as propane based on the molecular weight conversation of hexane to propane.

Table 7: List of heavy metals

Type 1 substances	Type 2 substances
Antimony (Sb)	Beryllium (Be)
Arsenic (As)	Chromium (Cr)
Cadmium (Cd)	Cobalt (Co)
Lead (Pb)	Manganese (Mn)
Mercury Hg)	Nickel (Ni)
	Selenium (Se)
	Tin (Sn)
	Vanadium (V)

2.2 Sample Location

The images and figures below show the sample location and site details.



Figure 1: Boiler Stack



Figure 2: Scrubber Vent Stack

Table 8: Boiler sample location summary

Sample location	Boiler stack
Stack Shape	CIRCULAR
Stack Diameter (m)	0.70
Stack Cross Section Area (m ²)	0.38
Distance to upstream disturbance (m)	3.4
Diameters (D)	4.9
Distance to downstream disturbance (m)	5.0
Diameters (D)	7.0
Total traverse point factors	1.05 , 1.0 , 1.05
Port size (mm)	100
Port Thread Type	Flange end
Number of traverses	2
Number of points per traverse	6
Total number of traverse points	12
Condition check requirements (Section 4 – AS4323.1)	
(a) The gas flow is basically in the same direction	Yes
(b) The gas velocity at all points greater than 3 m/sec	Yes
(c) Gas flow profile is steady with <15° cyclonic flow component	Yes
(d) Temperature difference between points <10% of mean	Yes
(e) The highest to lowest pitot pressure and velocity < 9:1 and 1.6:1 respectively	Yes
(f) Gas temperature above dew point	Yes

Table 9: Scrubber vent sample location summary

Sample location	Scrubber vent
Stack Shape	CIRCULAR
Stack Diameter (m)	0.08
Stack Cross Section Area (m ²)	0.01
Distance to upstream disturbance (m)	3.2
Diameters (D)	39
Distance to downstream disturbance (m)	0.8
Diameters (D)	9.8
Total traverse point factors	1.0 , 1.0 , 1.0
Port size (mm)	25
Port Thread Type	Flange end
Number of traverses	1
Number of points per traverse	2
Total number of traverse points	2
Condition check requirements (Section 4 – AS4323.1)	
(a) The gas flow is basically in the same direction	Not determinable
(b) The gas velocity at all points greater than 3 m/sec	No
(c) Gas flow profile is steady with <15° cyclonic flow component	Not determinable
(d) Temperature difference between points <10% of mean	Yes
(e) The highest to lowest pitot pressure and velocity < 9:1 and 1.6:1 respectively	Not determinable
(f) Gas temperature above dew point	Saturated

2.3 Test equipment

The sampling equipment was transported to site and specifically setup at the test location. Sampling was performed using heated probes and filters, with a constant flow and isokinetic sample console.

Equipment used during the course of the testing is sourced from Apex Instruments and Testo, industry leaders in the supply of source testing equipment.



Figure 3: Manual sample equipment



Figure 4: Combustion gas analyser

3 MEASUREMENT UNCERTAINTY

There is an inherent uncertainty associated with any scientific measurement, including stack emissions monitoring. The measurement uncertainty can be controlled with strict adherence to the reference methodology along with utilising appropriate calibration standards with corresponding acceptable uncertainty reports.

Many source sampling methods do not outline exact procedures for establishing direct measurement uncertainty. In the absence of a defined procedure, the uncertainty budgets presented are based on estimations using ISO-GUM method.

Each individual source and test may have a unique associated uncertainty, due largely to the stack sample location in relation to the positioning requirements of AS4323.1.

Table 10: Sample specific uncertainty budgets

Parameter	Reference method	Limit of measurement	Unit of measure	Uncertainty ± %
Flue gas temperature	USEPA Method 2	1	m/sec	5.0
Flue gas velocity	USEPA Method 2	1.5	m/sec	10 [100 ^a]
Oxygen	USEPA Method 3A	0.3	%-vol	5.0
Carbon dioxide	USEPA Method 3A	0.3	%-vol	8.0
Water vapour content	USEPA Method 4	0.5	%-vol	5.0
Total solid particulates	AS 4323.2	2	mg/sample	20
Sulphur dioxide	USEPA Method 6C	3.0	mg/sample	15
Oxides of nitrogen (as NO ₂)	USEPA Method 7E	2.1	mg/sample	15
Carbon monoxide	USEPA Method 10	1.5	mg/sample	15
Total VOCs	USEPA Method 18	1.0	mg/sample	20
Hydrogen chloride	USEPA Method 26A	1.0	mg/sample	10
Heavy metals	USEPA Method 29	0.3 to 50	µg/sample	20

^a Then Combine scrubber vent stack does not have an active forced flow, it only vents passively via the filling and natural 'breathing' of tanks. Therefore the air flow in the stack was measured at the limit of detection, resulting in an expanded uncertainty.

4 QUALITY ASSURANCE & QUALITY CONTROL (QA/QC)

AE operates within a quality system based upon the requirements of ISO17025. Our quality system defines specific procedures and methodologies to ensure any project undertaken by AE is conducted with the highest level of quality given the specific confines of each project. The overall objective of our QA/QC procedures is to representatively sample and accurately analyse components in the gas streams and therefore report valid measurements of emission concentrations.

To ensure representativeness of field work, our quality procedures target:

1. Correct sampling locations
2. Sample time
3. Frequency of samples and
4. Method selection & adherence

To ensure representativeness of lab work, our quality procedures target:

1. Sample preservation
2. Chain of custody (COC)
3. Sample preparation and
4. Analytical techniques

AE maintains strict quality assurance throughout all its sampling programs, covering on-site 'field work' and the analytical phase of our projects. Our QA program covers the calibration of all sampling and analytical apparatus where applicable and the use of spikes, replicate sample and reference standards. The test methodologies used for this project are outlined in section 2 of this document. Field test data has been recorded and calculated using direct entry into Microsoft Excel spreadsheets following the procedures of the appropriate test methods. Determination of emission concentrations has been performed using the same Microsoft Excel spreadsheets which are partially supplied as an attachment to this report. More detailed information can be supplied upon request.

QA/QC checks for this project will use validation techniques and criteria appropriate to the type of data and the purpose of the measurement to approve the test report. Records of all data will be maintained. Complete chain of custody (COC) procedures have been followed to document the entire custodial history of each sample. The COC forms also served as a laboratory sheet detailing sample ID and analysis requirements.

Table 11: Sampling data QA/QC checklist

Sampling Data QA/QC Checklist	Comment
Use of appropriate test methods	Yes
'Normal' operation of the process being tested	Yes – as instructed by client
Use of properly operating and calibrated test equipment	Yes
Use of high purity reagents	Yes
Performance of leak checks post sample (at least)	Yes

Table 12: Laboratory data QA/QC checklist

Laboratory Data QA/QC Checklist	Comment
Use of appropriate analytical methods	Yes
Use of properly operating and calibrated analytical equipment	Yes
Precision and accuracy comparable to that achieved in similar projects	Yes
Accurate reporting	Yes

Table 13: Process parameters^b

Source	Comment
Boiler	Boiler operates on a cycle based on steam pressure.
	Boiler fires up when steam pressure drops to set point, approximately 1,400 kpa
	Boiler shuts off when steam pressures reaches set point, approximately 1,650 kpa
	This results in approximately equal time on and off, 5 min cycle
	Water level varies from 50 to 60
Scrubber vent	The scrubber vent serves 3 tanks
	Tanks may contain oil, glycol vapour and glycol distillation (no glycol in the process during this testing)
	All 3 tanks feed to wet scrubber
	Fresh water flow into scrubber at approximately 100 kg/hour, resulting in complete replenishment approximately every 2 hours (200L scrubber)

^b Any process data presented has been gathered onsite through onsite installed processing monitoring equipment. No measurements are taken by AE.

4.1 Calibration gas details

The combustion gas analyser was calibrated using the below calibration gas cylinders.

Table 14: Calibration gas details

Parameter	Zero cylinder	Span cylinder 1	Span cylinder 2	Span cylinder 3
Contents	Nitrogen (UHP)	Carbon dioxide	Nitrogen dioxide	Nitric oxide
	-	24.7 %	39.3 ppm	598 ppm
	-	Oxygen	Oxygen	Sulfur dioxide
	-	10 %	6.94	288 %
	-	-	-	Carbon monoxide
	-	-	-	1009 ppm
	-	-	-	Carbon dioxide
	-	-	-	12.0
Certificate number	na	385962	472660	438298
Expiry date	na	24/08/2025	21/09/2024	27/09/2024

Figure 5: Analyser calibration details

Gas analyser SN		SN460 Testo 350XL(TB)					
Calibration performed by:		TB JIG					
		Carbon dioxide	Oxygen	Carbon monoxide	Sulfur dioxide	Nitric oxide	Nitrogen dioxide
Upscale gas cylinder reference number		385962	385962	438298 (diluted)	438298	438298	472660
Certificate expiry date	dd.mm.yyyy	24/08/2025	24/08/2025	27/09/2024	27/09/2024	27/09/2024	21/09/2024
Upscale calibration gas value (Cma)	ppm / vol-%	24.7	10	482	288	598	39.3
Mid-point gas cylinder reference number		438298	472660	438298 (diluted)	438298 (diluted)	438298 (diluted)	472660 (diluted)
Certificate expiry date	dd.mm.yyyy	27/09/2024	21/09/2024	27/09/2024	27/09/2024	3/09/2024	21/09/2024
Mid-point calibration gas value	ppm / vol-%	12	6.94	241	144	299	19.65
Date of pre-calibration	dd.mm.yyyy	22/04/2022					
Initial zero check response	ppm / vol-%	0	0	0	0	0	0
Zero point calibration error (initial)	%	0.0	0.0	0.0	0.0	0.0	0.0
Initial upscale calibration response	ppm / vol-%	24.87	10.06	485	290	602	38.8
Upscale calibration error (initial)	%	-0.7	-0.6	-0.6	-0.7	-0.7	1.3
Initial mid-point calibration response	ppm / vol-%	12.27	7.01	237	141	302	20
Mid-point calibration error (initial)	%	-1.1	-0.7	0.8	1.0	-0.5	-0.9
Date of post-calibration	dd.mm.yyyy	2/05/2022					
Post sampling zero check response	ppm / vol-%	0.04	0.03	0	0	0	0
Zero point calibration error (post sampling)	%	-0.2	-0.3	0.0	0.0	0.0	0.0
Zero drift	%	0.2	0.3	0.0	0.0	0.0	0.0
Post sampling upscale calibration response	ppm / vol-%	24.79	10.1	481	288	597	39
Upscale calibration error (post sampling)	%	-0.4	-1.0	0.2	0.0	0.2	0.8
Upscale drift	%	0.3	0.4	0.8	0.7	0.8	0.5
Post sampling mid-point calibration response	ppm / vol-%	12.23	7	239	140	293	19
Mid-point calibration error (post sampling)	%	-0.9	-0.6	0.4	1.4	1.0	1.7
Mid-point drift	%	0.2	0.1	0.4	0.3	1.5	2.5

Table 15: Field blank sample analysis

Site		Smorgon Fuels Darwin	
Run ID		Field blank analysis	
Test Date		28/04/2022	
dd/mm/yyyy			
Pollutant	Front half	Back half	
Metals	µg/sample	µg/sample	
Antimony (Sb)	< 4.0	< 4.0	
Arsenic (As)	< 4.0	< 4.0	
Beryllium (Be)	< 0.3	< 0.3	
Cadmium (Cd)	< 0.1	< 0.1	
Chromium (Cr)	1.0	< 0.3	
Cobalt (Co)	< 0.3	< 0.3	
Lead (Pb)	1.0	< 1.0	
Manganese (Mn)	3.0	< 0.3	
Nickel (Ni)	1.0	< 0.3	
Selenium (Se)	< 4.0	< 4.0	
Tin (Sn)	< 10.0	< 10.0	
Vanadium (V)	< 5.0	< 5.0	
Mercury	< 0.1	< 0.1	
Pollutant	Concentration		
Acid gases	mg/sample		
Hydrogen chloride	< 1		
Pollutant	Concentration		
Volatile organic compounds	µg/sample		
Total VOCs (as n-Propane)	< 10		

5 DEFINITIONS

The following terms and abbreviations may be used in this report:

Table 16: Definitions

Symbol	Definition
<	The analytes tested for was not detected; the value stated is the reportable limit of detection
Am ³	Gas volume in cubic metres at measured conditions
AS	Australian Standard
BH	Back half of sample train (filter holder and impingers) (referred to during sample recovery)
°C	Degrees Celsius
CARB	California Air Resources Board methods
dscm	dry standard cubic meters
FH	Front half of sample train (probe and filter holder) (referred to during sample recovery)
g	Grams
Heavy metals	Sum of Antimony, Arsenic, Beryllium, Chromium, Cobalt, Lead, Manganese, Nickel, Selenium. Cadmium and mercury are reported individually.
kg	Kilograms
Lower range	The sum of a list of a particular group of compounds, where only those individual congeners/compounds that are detectable in the sample have been included in the total. Results below the limit of detection have not been included.
m	Metres
m ³	actual gas volume in cubic metres as measured
mbar	Millibars
mg	Milligrams (10 ⁻³ grams)
min	Minute
ml	Millilitres
mmH ₂ O	Millimetres of water
Mole	SI unit that measures the amount of substance
N/A	Not applicable
ng	Nanograms (10 ⁻⁹ grams)
Nm ³	Gas volume in dry cubic metres at standard temperature and pressure (0°C and 101.3 kPa)
NMI	National Measurement Institute
NM VOC	Non methane volatile organic compound
NR	Not required on this occasion
PM	Particulate matter
ppb	Parts per billion
ppm	Parts per million
sec	Second
Sm ³	Gas volume in dry cubic metres at standard temperature and pressure (0°C and 101.3 kPa) and corrected to a standardised value (e.g. 15% O ₂)
STP	Standard temperature and pressure (0°C and 101.3 kPa) & dry
Upper range	The sum of a list of a particular group of compounds, all results, including those at the limit of detection are included in the summation.
USEPA	United States Environmental Protection Authority

6 RESULTS

6.1 Boiler Stack

Table 17: Boiler stack summary of test results

Parameter	Test 1 Boiler Stack	Test 2 Boiler Stack	Emission limit	Unit	Reference
Sample dates	28/04/2022	28/04/2022		dd.mm.yyyy	-
Average source temperature	105	108	-	°C	-
Flue gas water vapour content	8.5	8.5	-	vol-%	-
Carbon dioxide concentration	3.0	3.0	-	vol-%	STP - dry
Oxygen concentration	15.8	15.8	-	vol-%	STP - dry
Flue gas molecular weight - dry	1.3	1.3	-	kg/Nm ³	STP - dry
Flue gas velocity	5.0	5.1	-	m/sec	STP - dry
Flue gas volume flow	76.7	76.4	-	Nm ³ /min	STP - dry
Particulate matter	< 1.4	< 1.5	50	mg/Nm ³	STP - dry
- emission rate	< 0.11	< 0.12	-	g/min	
Oxides of nitrogen (as NO ₂)	25	25	350	mg/Nm ³	STP - dry
- at 7% O ₂	69	69	-	mg/Nm ³	
- emission rate	1.9	1.9	-	g/min	
Carbon monoxide	11	11	125	mg/Nm ³	STP - dry
- emission rate	0.84	0.84	-	g/min	
Total heavy metals [1]	< 0.051	< 0.041	1.0	mg/Nm ³	STP - dry
- emission rate	< 3.9	< 3.1	-	mg/min	
Cadmium	0.0021	0.00044	0.2	mg/Nm ³	STP - dry
- emission rate	0.16	0.034	-	mg/min	
Mercury	0.000069	0.000044	0.2	mg/Nm ³	STP - dry
- emission rate	0.0053	0.0034	-	mg/min	
Hydrogen chloride	< 0.7	< 0.8	100	mg/Nm ³	STP - dry
- emission rate	< 0.054	< 0.058	-	g/min	
Sulfur dioxide	< 3	< 3	150	mg/Nm ³	STP - dry
- emission rate	< 0.2	< 0.2	-	g/min	
Total VOCs (as n-propane)	< 0.8	< 0.8	40	mg/Nm ³	STP - dry
- emission rate	< 0.06	< 0.06	-	g/min	

Table 18: Sample information – HCl run 1

Site	Smorgon Fuels Darwin	
Sample Location	Boiler	
Reference Method	USEPA Method 26A - ISOKINETIC	
Run ID	9	
Test Parameter	PM & HCl	
Test Date	dd/mm/yyyy	28/04/2022
Start Time	hh:mm	12:09
End Time	hh:mm	13:21
Average Stack Temperature	°C	106
Absolute Stack Pressure	mb	1009
Moisture Content	% v/v	8.5
Dry Gas Density	kg/Nm ³	1.30
Dry Gas Molecular Weight	g/g-mole	29.1
Sample Volume (dry gas meter)	Nm ³	1.40
Stack Gas Velocity	m/sec	5.0
Actual Stack Flow Rate	m ³ /min	116
Dry Standard Stack Flow Rate	Nm ³ /min	76
Percent Isokinetic Rate	%	101
Pollutant	Concentration standard conditions	Emission Rate
PM & HCl	mg/Nm ³	g/min
HCl	< 0.7	< 0.05

Table 19: Sample information – HCl run 2

Site	Smorgon Fuels Darwin	
Sample Location	Boiler	
Reference Method	USEPA Method 26A - ISOKINETIC	
Run ID	10	
Test Parameter	PM & HCl	
Test Date	dd/mm/yyyy	28/04/2022
Start Time	hh:mm	12:09
End Time	hh:mm	13:21
Average Stack Temperature	°C	107
Absolute Stack Pressure	mb	1009
Moisture Content	% v/v	8.3
Dry Gas Density	kg/Nm ³	1.30
Dry Gas Molecular Weight	g/g-mole	29.1
Sample Volume (dry gas meter)	Nm ³	1.32
Stack Gas Velocity	m/sec	5.0
Actual Stack Flow Rate	m ³ /min	117
Dry Standard Stack Flow Rate	Nm ³ /min	76
Percent Isokinetic Rate	%	100
Pollutant	Concentration standard conditions	Emission Rate
PM & HCl	mg/Nm ³	g/min
	HCl < 0.8	< 0.06

Table 20: Sample information – Metal run 1

Site	Smorgon Fuels Darwin	
Sample Location	Boiler	
Reference Method	USEPA Method 29 - ISOKINETIC	
Run ID	7	
Test Parameter	PM & Metals	
Test Date	dd/mm/yyyy	28/04/2022
Start Time	hh:mm	9:25
End Time	hh:mm	10:37
Average Stack Temperature	°C	104
Absolute Stack Pressure	mb	1008
Moisture Content	% v/v	8.4
Dry Gas Density	kg/Nm ³	1.30
Dry Gas Molecular Weight	g/g-mole	29.1
Sample Volume (dry gas meter)	Nm ³	1.46
Stack Gas Velocity	m/sec	5.1
Actual Stack Flow Rate	m ³ /min	117
Dry Standard Stack Flow Rate	Nm ³ /min	77
Percent Isokinetic Rate	%	104
Pollutant	Concentration standard conditions	Emission Rate
PM & Metals	mg/Nm ³	mg/min
Antimony (Sb)	< 0.0039	< 0.30
Arsenic (As)	< 0.0039	< 0.30
Beryllium (Be)	< 0.0003	< 0.022
Cadmium (Cd)	0.0021	0.16
Chromium (Cr)	0.00069	0.053
Cobalt (Co)	< 0.00029	< 0.022
Lead (Pb)	0.019	1.4
Manganese (Mn)	0.00062	0.047
Nickel (Ni)	0.0025	0.20
Selenium (Se)	< 0.0039	< 0.30
Tin (Sn)	< 0.0097	< 0.75
Vanadium (V)	< 0.0048	< 0.37
Mercury	0.000069	0.0053
Total Heavy Metals (upper bound)	< 0.051	< 3.9

Table 21: Sample information – Metals run 2

Site	Smorgon Fuels Darwin	
Sample Location	Boiler	
Reference Method	USEPA Method 29 - ISOKINETIC	
Run ID	8	
Test Parameter	PM & Metals	
Test Date	dd/mm/yyyy	28/04/2022
Start Time	hh:mm	9:24
End Time	hh:mm	10:36
Average Stack Temperature	°C	108
Absolute Stack Pressure	mb	1008
Moisture Content	% v/v	8.7
Dry Gas Density	kg/Nm ³	1.30
Dry Gas Molecular Weight	g/g-mole	29.1
Sample Volume (dry gas meter)	Nm ³	1.36
Stack Gas Velocity	m/sec	5.1
Actual Stack Flow Rate	m ³ /min	117
Dry Standard Stack Flow Rate	Nm ³ /min	76
Percent Isokinetic Rate	%	103
Pollutant	Concentration standard conditions	Emission Rate
PM & Metals	mg/Nm ³	mg/min
Antimony (Sb)	< 0.0041	< 0.32
Arsenic (As)	< 0.0041	< 0.32
Beryllium (Be)	< 0.00031	< 0.024
Cadmium (Cd)	0.00044	0.034
Chromium (Cr)	0.00073	0.056
Cobalt (Co)	< 0.00031	< 0.024
Lead (Pb)	0.0088	0.67
Manganese (Mn)	< 0.0015	< 0.11
Nickel (Ni)	0.00073	0.056
Selenium (Se)	< 0.0041	< 0.32
Tin (Sn)	< 0.010	< 0.79
Vanadium (V)	< 0.0052	< 0.40
Mercury	0.000044	0.0034
Total Heavy Metals (upper bound)	< 0.041	< 3.1

Table 22: Sample information – VOCs run 1

Site	Smorgon Fuels Darwin	
Sample Location	Boiler	
Reference Method	USEPA Method 18 - CONSTANT FLOW	
Run ID	5	
Test Parameter	VOCs	
Test Date	dd/mm/yyyy	28/04/2022
Start Time	hh:mm	9:50
End Time	hh:mm	10:20
Average Stack Temperature	°C	108
Absolute Stack Pressure	mb	1008
Moisture Content	% v/v	8.4
Dry Gas Density	kg/Nm ³	1.30
Dry Gas Molecular Weight	g/g-mole	29.1
Sample Volume (dry gas meter)	Nm ³	0.02
Stack Gas Velocity	m/sec	5.1
Actual Stack Flow Rate	m ³ /min	117
Dry Standard Stack Flow Rate	Nm ³ /min	77
Percent Isokinetic Rate	%	N/A
Pollutant	Concentration standard conditions	Emission Rate
Total (non-methane) VOCs	mg/Nm ³	g/min
Total VOCs - as n-propane	< 0.8	< 0.06

Table 23: Sample information – VOCs run 2

Site	Smorgon Fuels Darwin	
Sample Location	Boiler	
Reference Method	USEPA Method 18 - CONSTANT FLOW	
Run ID	6	
Test Parameter	VOCs	
Test Date	dd/mm/yyyy	28/04/2022
Start Time	hh:mm	12:15
End Time	hh:mm	12:45
Average Stack Temperature	°C	106
Absolute Stack Pressure	mb	1009
Moisture Content	% v/v	8.5
Dry Gas Density	kg/Nm ³	1.30
Dry Gas Molecular Weight	g/g-mole	29.1
Sample Volume (dry gas meter)	Nm ³	0.02
Stack Gas Velocity	m/sec	5.0
Actual Stack Flow Rate	m ³ /min	116
Dry Standard Stack Flow Rate	Nm ³ /min	76
Percent Isokinetic Rate	%	N/A
Pollutant	Concentration standard conditions	Emission Rate
VOCs	mg/Nm ³	g/min
Total VOCs - as n-propane	< 0.8	< 0.06

Table 24: Sample information – Gases run 1

Site	Smorgon Fuels Darwin	
Sample Location	Boiler	
Reference Method	USEPA Method 3A, 7E & 10	
Run ID	Various	
Test Parameter	O ₂ , CO ₂ , NO _x , CO	
Test Date	dd/mm/yyyy	28/04/2022
Start Time	hh:mm	12:09
End Time	hh:mm	13:21
Average Stack Temperature	°C	105
Absolute Stack Pressure	mb	1009
Moisture Content	% v/v	8.5
Dry Gas Density	kg/Nm ³	1.30
Dry Gas Molecular Weight	g/g-mole	29.1
Stack Gas Velocity	m/sec	5.0
Actual Stack Flow Rate	m ³ /min	117
Dry Standard Stack Flow Rate	Nm ³ /min	77
Pollutant	Concentration standard conditions	Emission Rate
O ₂ , CO ₂ , NO _x , CO	STP	g/min
Oxygen (% v/v)	15.8	-
Carbon dioxide (% v/v)	3.0	-
Sulfur dioxide (mg/m ³)	< 2.9	< 0.22
Carbon monoxide (mg/m ³)	11	0.84
Oxides of nitrogen (mg/m ³)	25	1.93

Table 25: Sample information – Gases run 2

Site	Smorgon Fuels Darwin	
Sample Location	Boiler	
Reference Method	USEPA Method 3A, 7E & 10	
Run ID	Various	
Test Parameter	O ₂ , CO ₂ , NO _x , CO	
Test Date	dd/mm/yyyy	28/04/2022
Start Time	hh:mm	12:09
End Time	hh:mm	10:36
Average Stack Temperature	°C	105
Absolute Stack Pressure	mb	1009
Moisture Content	% v/v	8
Dry Gas Density	kg/Nm ³	1
Dry Gas Molecular Weight	g/g-mole	29
Stack Gas Velocity	m/sec	5
Actual Stack Flow Rate	m ³ /min	117
Dry Standard Stack Flow Rate	Nm ³ /min	77
Pollutant	Concentration standard conditions	Emission Rate
O ₂ , CO ₂ , NO _x , CO	STP	g/min
Oxygen (% v/v)	15.8	-
Carbon dioxide (% v/v)	3.0	-
Sulfur dioxide (mg/m ³)	< 2.9	< 0.22
Carbon monoxide (mg/m ³)	11	0.84
Oxides of nitrogen (mg/m ³)	25	1.93

6.2 Combined Scrubber Vent Stack

Table 26: Combined scrubber vent stack summary of test results

Parameter	Test 1 Vent Stack	Test 2 Vent Stack	Emission limit	Unit	Reference
Sample dates	27/04/2022	27/04/2022		dd.mm.yyyy	-
Average source temperature	37	37	-	°C	-
Flue gas water vapour content	6	6	-	vol-%	-
Carbon dioxide concentration	0.0	0.0	-	vol-%	STP - dry
Oxygen concentration	20.8	20.8	-	vol-%	STP - dry
Flue gas molecular weight - dry	1.3	1.3	-	kg/Nm ³	STP - dry
Flue gas velocity	< 1.1	< 1.1	-	m/sec	STP - dry
Flue gas volume flow	< 0.3	< 0.3	-	Nm ³ /min	STP - dry
Total VOCs (as n-propane)	< 1.1	< 1.2	40	mg/Nm ³	STP - dry
- emission rate	< 0.0003	< 0.0003	-	g/min	STP - dry

Table 27: Sample information – VOCs run 1

Site	Smorgon Fuels Darwin	
Sample Location	Scrubber vent	
Reference Method	USEPA Method 18 - CONSTANT FLOW	
Run ID	1	
Test Parameter	VOCs	
Test Date	dd/mm/yyyy	27/04/2022
Start Time	hh:mm	12:45
End Time	hh:mm	13:05
Average Stack Temperature	°C	37
Absolute Stack Pressure	mb	1007
Moisture Content	% v/v	5.9
Dry Gas Density	kg/Nm ³	1.29
Dry Gas Molecular Weight	g/g-mole	28.8
Sample Volume (dry gas meter)	Nm ³	0.01
Stack Gas Velocity	m/sec	< 1.1
Actual Stack Flow Rate	m ³ /min	< 0.4
Dry Standard Stack Flow Rate	Nm ³ /min	< 0.3
Percent Isokinetic Rate	%	N/A
Pollutant	Concentration standard conditions	Emission Rate
Total (non-methane) VOCs	mg/Nm ³	g/min
Total VOCs - as n-propane	< 1.1	< 0.0003

Table 28: Sample information – VOCs run 2

Site		Smorgon Fuels Darwin	
Sample Location		Scrubber vent	
Reference Method		USEPA Method 18 - CONSTANT FLOW	
Run ID		2	
Test Parameter		VOCs	
Test Date	dd/mm/yyyy	27/04/2022	
Start Time	hh:mm	13:20	
End Time	hh:mm	13:40	
Average Stack Temperature		°C	37
Absolute Stack Pressure		mb	1007
Moisture Content		% v/v	5.9
Dry Gas Density		kg/Nm ³	1.29
Dry Gas Molecular Weight		g/g-mole	28.8
Sample Volume (dry gas meter)		Nm ³	0.01
Stack Gas Velocity		m/sec	< 1.1
Actual Stack Flow Rate		m ³ /min	< 0.4
Dry Standard Stack Flow Rate		Nm ³ /min	< 0.3
Percent Isokinetic Rate		%	N/A
Pollutant		Concentration standard conditions	Emission Rate
Total (non-methane) VOCs		mg/Nm ³	g/min
Total VOCs - as n-propane		< 1.2	< 0.0003