



Darwin Turf Club

Annual Monitoring Report

Darwin Turf Club Inc

2021 – 2022

→ The Power of Commitment



Project name		Darwin Turf Club – EPL Monitoring					
Document title		Darwin Turf Club Annual Monitoring Report					
Project number		12526136					
File name		Annual Monitoring Report					
Status Code	Revision	Author	Reviewer		Approved for issue		
			Name	Signature	Name	Signature	Date
S4	0	S Stapleton	N Fries		N Fries		13.09.22

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1. Introduction

1.1 Background

Darwin Turf Club Incorporated (DTC) engaged GHD Pty Ltd (GHD) to prepare an Annual Report summarising the ongoing groundwater and air-toxics environmental monitoring at the Darwin Turf Club (the Site). Darwin Turf Club Racecourse covers an area of approximately 47 hectares (ha) and is situated approximately 4 km north of Darwin CBD. A general layout of the site is provided in Figure 1.

The Site is located off Dick Ward Drive, Fannie Bay, Northern Territory (NT). The site is bound by Dick Ward Drive to the north, stables and Douglas Street to the east, Playford Street and Wells Street to the south and west. Residential properties are located on the opposite sides of Douglas Street, Playford Street and Wells Street facing the Site.

DTC hold an Environmental Protection Licence (EPL) issued by the Northern Territory Environmental Protection Authority (NT EPA), which permits the application of oil to the racecourse surface, as part of soil conditioning and track maintenance works. NT EPA conditions contained within the EPL (EPL 218-01) require DTC to undertake routine environmental monitoring of groundwater and air quality before, during and after the application of oil to the track surface. The original EPL 218 was updated in April 2022 with new conditions, including waste oil sampling prior to oil application event as detailed in Section 2.3.

GHD has undertaken the routine monitoring on behalf of DTC since April 2020, amounting to 11 groundwater monitoring events (GMEs) and five air quality monitoring events (AQMEs). The air quality sampling is part of a three-year reporting programme at the site to comply with EPL 218-01. Primarily, this programme involves a review of key air quality measurements during the four years of operations of the Site.

The GMEs and AQMEs were undertaken in accordance with the EPL and DTC Environmental Management Plan (GHD, 2012).

The results of the monitoring are reported to DTC at the conclusion of each monitoring event. The monitoring reports from September 2021 and April 2022 have been incorporated into this annual report.

1.2 Purpose of this report

As part of NT EPA reporting requirements, DTC is required to submit an Annual Monitoring Report within 10-days of the anniversary of the creation of EPL 218-01 each year. DTC engaged GHD to develop this report on their behalf.

The purpose of this report is to document the results and outcomes of the monitoring events between 1 July 2021 through to June 30, 2022. Further detail on the individual monitoring events during this period can be found within the following Monitoring Reports previously supplied to DTC and NT EPA:

- GHD (2021). *Darwin Turf Club – EPL Monitoring GME and Air Monitoring Report* (September 2021).
- GHD (2022). *Darwin Turf Club – EPL Monitoring GME and Air Monitoring Report* (April 2022).

These individual monitoring reports are attached as Appendix A.

1.3 Scope

The following scope of work was undertaken:

- Collection of groundwater samples at seven groundwater wells as specified in the DTC Environmental Management Plan (EMP) (GHD 2022). The GMEs were undertaken before and after track conditioning activities.
- Air-toxics monitoring, during track conditioning activities, at three locations specified in EPL 218-01.

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. Amended April 2013 (ASC NEPM).
- National Environment Protection Council (NEPC) National Environment Protection (Air Toxics) Measure (NEPM), 1999. (Air NEPM).
- NT EPA, 2018. Guideline for Reporting on Environmental Monitoring, (May 2016).

1.4 Limitations

This report has been prepared by GHD for Darwin Turf Club Inc and may only be used and relied on by Darwin Turf Club Inc for the purpose agreed between GHD and Darwin Turf Club Inc as set out in section 1 of this report.

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

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

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

GHD has prepared this report on the basis of information provided by Darwin Turf Club Inc and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

Site conditions (including the presence of hazardous substances and/or site contamination) may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.



Figure 1 Location of the Darwin Turf club, Fannie Bay Racecourse

2. Methods

2.1 Groundwater monitoring program

In accordance with EPL requirements, the GMEs are undertaken on dates surrounding oil application events. For each application event, one GME is undertaken within two weeks prior to application, and a second GME is undertaken with 48 hours after the application.

The purpose of the GMEs is to measure standing water level (SWL) and collect groundwater samples for laboratory analysis from the seven existing on site monitoring bores. The bore locations are presented in Figure 2. The GMEs during this annual reporting period were undertaken on the following dates:

- 7 September 2021 (GME 8)
- 15 September 2021 (GME 9)
- 20 April (GME 10)
- 11 May (GME 11).

Specific details on the methods implemented for each GME are described within the individual monitoring reports (refer to Appendix A). A summary of the typical groundwater sampling programme and testing schedule is described in Table 1.

Table 1 Groundwater sampling programme 2021-2022

Sample ID	Location (in relation to track)	Contaminants of potential concern (CoPC)	Context of sampling
MW01	North	– Total Recoverable Hydrocarbons (TRH). – Benzene, Toluene, Ethylbenzene, o- & m- & p- Xylenes (BTEX). – Dissolved Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc).	Capture the quality of groundwater assumed to be exiting the site to the north.
MW02	North		
MW03	Northwest		
MW04	Northeast		
MW05	East		Capture the quality of groundwater to the east of the site.
MW06	South		Capture the quality of groundwater to the south of the site (assumed to be the background reference site).
MW07	West		Capture the quality of groundwater to the west of the site.

2.1.1 Groundwater sampling

During each GME, the following activities were completed at each groundwater bore location:

- Each bore was visually inspected, and the bore condition was noted.
- The bore cap was removed, and the headspace was immediately monitored for volatile organic compounds (VOCs) using a calibrated photo-ionisation detector (PID).
- An initial standing water level (SWL) reading was measured using a calibrated interface probe from the top of well casing.
- Groundwater sampling was undertaken using low flow sampling techniques comprising a peristaltic pump and flow cell with calibrated YSI Pro DSS water quality meter.
- Purging was undertaken until the field water quality parameters listed in Table 2 stabilised.
- Samples were collected into laboratory-supplied containers with appropriate preservatives required for each analyte.
- Samples for metals analysis were field-filtered to <0.45 µm using a disposable in-line filter.

- The samples were placed in chilled storage containers and transported under Chain of Custody (COC) documentation to ALS Environmental for laboratory analysis.
- Additional quality assurance / quality control (QAQC) samples were collected to maintain data quality.

2.1.2 Groundwater assessment criteria

The EMP (GHD 2022) prescribes several groundwater assessment criteria to determine the acceptability and investigation limits of individual analytes in groundwater at the Site. Where exceedances to these criteria are reported from field water quality measurements or laboratory results, a discussion is presented within the individual monitoring reports. EPL 218-01 requires notification of these exceedances to NT EPA in accordance with EPL Clause 34.

These acceptance criteria have been summarised in Table 2.

Table 2 EPL 218 Groundwater acceptance criteria values

Parameters	Units	Acceptance Limit
Field water quality parameters		
pH	pH units	6.0 – 8.0
Temperature	°C	N/A
Turbidity	NTU	2 – 15
Electrical conductivity	µS/cm	20 – 250
Dissolved Oxygen	% saturation	80 – 110
Photo ionisation detector reading	ppm	50
Laboratory parameters		
Heavy metals		
Arsenic	mg/L	0.094
Cadmium	mg/L	0.0004
Chromium	mg/L	0.006
Copper	mg/L	0.0018
Lead	mg/L	0.0056
Mercury	mg/L	0.0019
Nickel	mg/L	0.013
Zinc	mg/L	0.015
BTEX		
Benzene	mg/L	0.3
Toluene	mg/L	0.3
Ethylbenzene	mg/L	0.005
Xylenes	mg/L	0.075
Total Recoverable Hydrocarbons (TRH)		
Total TRH C –C	mg/L	0.6



Figure 2 Environmental Monitoring Locations

2.2 Air quality sampling program

Environmental monitoring of air quality is a requirement under the EPL 218-01 and is to be carried out during the application of waste oil to the racecourse. Oil is applied to the racecourse twice a year to maintain cohesiveness and reduce erosion to the track.

The programme typically consists of a single round of air sampling undertaken at three locations on the day of oil application. Sample locations are labelled AQM01, AQM02 and AQM03 and are situated along the south end of the racecourse. This sampling design aims to capture potential emissions of volatile hydrocarbons, notably BTEX, from the application of waste oil. A summary of the air quality monitoring locations and analytical suite is presented in Table 3.

Specific details on the methods implemented for each AQME are described within the individual monitoring reports (refer to Appendix A).

Table 3 Air quality monitoring program 2021-2022

Sample ID	Location (in relation to track)	Contaminants of potential concern (CoPC)	Context of sampling
AQM01	Southwest	BTEX	To determine the quality of the air potentially exiting the Site towards the residential properties in the southwest, south and southeast of the Site.
AQM02	South		
AQM03	Southeast		

2.2.1 Air quality sampling

AQME were undertaken on the two oil application days during this annual reporting period, which were 14 September 2021 and 10 May 2022.

Portable Summa® canisters fitted with flow meters were placed at the three locations at the site to collect a single round of air samples on each application day. The Summa® canister draws a sample under vacuum and the flow meter controls the continuous intake of air for a period of 12-hours.

During each AQME, the following activities were completed at each air quality sampling location:

- Portable canisters were calibrated for an ultra-low-level 12-hour fill time prior to setup.
- The pressure gauges on each of the canisters were checked to ensure a vacuum pressure of approximately - 30 kPa within the canister prior to sampling.
- The canisters were set up at each of the three locations prior to the commencement of oil application.
- At the time of deployment, the weather conditions were noted.
- The sampling used portable 6 L Summa evacuated canisters for sample capture, placed between 1.2 – 1.5 m above ground level.
- Once the canister fill period had expired, the cannisters were recovered and transported under CoC documentation to Eurofins MGT for laboratory analysis.
- The samples were analysed for BTEX compounds.
- A weather monitoring station was deployed during the air quality sampling period to collect data on wind speed and direction and temperature to inform the assessment of air quality samples.
- Samples were analysed by the receiving laboratory using a NATA-accredited laboratory.

2.2.2 Air quality assessment criteria

Air quality assessment criteria specified in the EMP (2022) have been derived from the Air NEPM. These acceptance limits are summarised in Table 4.

Table 4 EPL 218 Air quality acceptance criteria values

Parameter	Units	Trigger Value
BTEX		
Benzene	ppb ¹	3
Toluene	ppb	1,000
o-Xylene	ppb	250
M & p Xylenes	ppb	250

1 – parts per billion

2.3 Oil sampling

As per the EPL 218-01 conditions provided on the 14 April 2022, analysis of a representative sample (where practicable) of the track conditioning oil was undertaken prior to application. Oil analysis was undertaken to ensure the composition is not contaminated by polychlorinated biphenyls and per- and polyfluoroalkyl substances (PFAS) to the lowest limit of laboratory reporting. The sample tested was the motor oil component of the mixture.

2.3.1 Sampling protocol

Oil that is applied to the track for conditioning was collected from Cleanaway on 20 April 2022.

Oil samples were collected into laboratory supplied containers with appropriate preservative, as required. Samples were immediately placed into chilled coolers and sent to NATA accredited laboratory.

2.4 Quality control and assurance

2.4.1 Field quality control methods

All field works were undertaken by experienced environmental scientists in accordance with GHD's Standard Field Operating Procedures and in compliance with NEPM requirements.

2.4.2 Blind and split duplicates

A single sample is divided into three separate sampling containers. The parent sample and the blind sample are sent anonymously to the primary project laboratory with the split sample sent to the secondary laboratory. Blind duplicates provide an indication of the analytical precision of the laboratory but are inherently influenced by other factors such as sampling techniques and sample media heterogeneity. Split duplicate samples provide an indication of the repeatability of the results between laboratories.

One set of field duplicate samples (Blind and Split) was collected and analysed as part of the analytical program.

The precision of the data is assessed by calculating the Relative Percent Difference (RPD) between duplicate sample pairs, using the following formula:

$$RPD\% = \frac{|C_o - C_d|}{C_o + C_d} \times 200$$

Where C_o = Analyte concentration of the original sample
 C_d = Analyte concentration of the duplicate sample

Nominal acceptance criteria of 30% and 50% were adopted for field duplicates of inorganics and organics, respectively. Blind and split duplicate samples should return RPDs within these criteria. However, it is noted that the criteria will not always be achieved, particularly in heterogeneous soil or fill materials, or at low analyte concentrations. In the event RPD values exceed these limits, an explanation is provided within the individual monitoring reports attached within Appendix A.

2.4.3 Laboratory quality control methods

In addition to field QAQC procedures, the receiving laboratories also adopt internal QAQC procedures to ensure data quality and reliability. These procedures are required as part of their NATA-accreditation.

The nominated NATA accredited analytical laboratories (ALS Environmental and Eurofins MGT Laboratory) adopted their internal procedures and methods in accordance with their quality assurance systems. Results from these procedures are provided alongside the individual monitoring reports in Appendix A.

3. Groundwater monitoring results

3.1 Field parameters

The methods described in Section 2 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, however, in September (GME 8 & 9) MW01, MW02 and MW04 were inaccessible due to casing damage at ground level. These bores were reinstated in 2021 and were assessable for monitoring in April 2022.

While gauging the 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. PID readings obtained during gauging were within the acceptable limits.

As described in Section 2.1, field water quality parameter measurements were measured in each of the sampled wells during purging using a calibrated YSI Pro DSS water quality meter and flow cell.

Water quality observations made throughout the GMEs during this monitoring period are available in the individual GME reports from September 2021 and April 2022 (refer to Appendix A). Water quality measurements were not collected in September (GME 8 & 9) for MW01 and MW02 due to a blockage at ground level within the bore casing.

A summary of the water quality parameters and field observations from this annual reporting period are provided in Table 5.

Table 5 Groundwater quality parameters: July 2021 – June 2022

Well ID	Well depth (mbTOC)	SWL (mbTOC)	Physical parameters					Comments and observations
			Temp (°C)	DO (%)	pH	EC (μS/cm)	Turbidity (NTU)	
GME 8 (September 2021)								
MW01	Inaccessible – Blocked near ground level due to casing damage.							
MW02	Inaccessible – Blocked near ground level due to casing damage.							
MW03	4.64	3.248	32.1	2.9	5.85	545	66.11	High turbidity, red/brown colour, becoming clear. No odour, no sheen.
MW04	Casing damaged		32.2	4	5.73	24,974	0	Bore casing broken at ground level, top section blocked. Brown, high turbidity, becoming clear. No odour, no sheen.
MW05	5.47	5.061	30.6	78.4	6.61	96.6	356.14	Brown, high turbidity, clearing up. No odour, no sheen.
MW06	6.2	5.57	32.4	20.8	5.6	111.3	395.5	Red-brown, high turbidity, becoming clear, no odour, no sheen.
MW07	6.05	3.554	30.2	11.9	5.46	2,261	2.3	Clear, no turbidity, no odour, no sheen.
GME 9 (September 2021)								
MW01	Inaccessible – Blocked near ground level due to casing damage.							
MW02	Inaccessible – Blocked near ground level due to casing damage.							
MW03	4.61	3.314	33.7	3	5.96	487.6	N/A	Brown-grey, medium turbidity, clearing up, no odour, no sheen.
MW04	5.09	2.87	32.6	5.7	5.63	22,088	N/A	SWL and bore depth measured through gap in broken casing at ground level. Clear, no turbidity, hydrogen sulphide odour, no sheen.
MW05	5.48	5.185	31.3	83.6	6.39	85.8	N/A	Low turbidity, no odour, no sheen, then clearing up.
MW06	6.64	5.624	32.3	22.6	5.56	94.7	N/A	Orange, very high turbidity, no odour, no sheen. Then high turbidity.
MW07	6.04	3.635	31.1	20.5	5.04	1,925	N/A	Clear, no turbidity, no odour, no sheen.
GME 10 (April 2022)								
MW01	3.994	2.12	34.2	21.2	5.66	302.2	175	Orange to pale orange, very high turbidity, no odour, no sheen.
MW02	3.988	2.261	33.2	92.9	6.51	436.5	164.8	Orange to pale orange, very high turbidity, high sediment load (sandy), no odour, no sheen.
MW03	4.595	2.314	32.9	31.9	6.17	324.4	154.1	Clear to cloudy, low turbidity, no odour, no sheen.
MW04	5.007	1.74	35.3	38	5.85	17,431	42	Clear to cloudy, no turbidity, H2S, no sheen. Organic matter in water samples was present.
MW05	5.47	3.556	32.1	74.8	5.58	145.2	147.6	Clear, no turbidity, no odour, no sheen.
MW06	6.621	4.145	32.4	36.5	5.33	343.8	195	Cloudy, no turbidity, no odour, no sheen. Bore was found un-capped.
MW07	6.033	2.64	30.7	43.7	4.9	149.1	225.6	Clear, no turbidity, no odour, no sheen.

Well ID	Well depth (mbTOC)	SWL (mbTOC)	Physical parameters					Comments and observations
			Temp (°C)	DO (%)	pH	EC (µS/cm)	Turbidity (NTU)	
GME 11 (April 2022)								
MW01	4.012	2.366	33.6	3.8	5.75	309.6	149.5	Cloudy white/orange, low turbidity, no odour, no sheen.
MW02	4.03	2.442	33.4	4.4	5.58	319.5	157.5	Orange, very high turbidity, no odour, no sheen. High sediment load. Existing tubing blocked from sediment – replaced.
MW03	4.605	2.572	33.5	1.5	5.58	333.8	140.5	Brown/yellow, medium turbidity, no odour, no sheen. Replaced existing bent and blocked tubing.
MW04	5.071	2.154	33.2	11.5	6.02	15,605	-15	Slight cloudy white, very low turbidity, H2S odour, no sheen.
MW05	5.475	3.938	32.9	57.4	5.75	144.4	150.5	Clear, no turbidity, no odour, no sheen.
MW06	6.615	4.406	32.2	2.6	5.55	285.2	170.7	Slight cloudy, very low turbidity, no odour, no sheen.
MW07	6.026	3.007	31.1	28.7	5.11	127	198.3	Slight cloudy white to clear, very low to no turbidity, no odour, no sheen. No PID reading was taken at this well as EPA representative opened well cap prior.

3.1.1 Water quality results assessment

Generally, the water quality at the Site is indicative of a shallow freshwater aquifer, with the northern bores intersecting an area of seawater intrusion into this aquifer. This is expected considering the close proximity of the Site to the coastline towards the north and west. This is demonstrated by the regular occurrences of higher electrical conductivity (EC) values observed in the groundwater from bores MW04 and MW07.

Field pH data indicates the groundwater is slightly to moderately acidic, which is common in shallow Top End aquifers.

Turbidity field observations ranged from 0.00 to 395.5 NTU. The highest turbidity level was recorded in September at MW06. Turbidity levels 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. The full trends of groundwater purge parameters are presented within the individual monitoring reports (see Appendix A).

3.2 Laboratory results

The results of the groundwater analysis are summarised in the appendices of the individual monitoring reports (see Appendix A). These results are provided both in the raw laboratory report documentation and summarised within the individual reports for reference.

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

Specific exceedances reported during each monitoring event are presented in the relevant monitoring report (see Appendix A). The laboratory analytical results are presented against the relevant exceedance criteria in Appendix B of the monitoring event-dedicated reports.

4. Air quality monitoring results

Two AQMEs were conducted on the oil application days within this annual reporting period. The dates of oil applications at the Site were:

- 14 September 2021
- 10 May 2022.

The AQMEs were conducted in compliance with the methods prescribed in Section 2.2. Detailed results of these AQMEs are presented within the dedicated monitoring reports for each event, attached as Appendix A.

4.1 September 2021 AQME results

The sampling was carried out starting approximately 0700 on 14 September 2021. At the time of canister deployment, the weather conditions were noted as warm, humid, sunny with calm to north-westerly winds.

Temperature, wind speed and wind direction were monitored with a calibrated, portable weather station. The results of this monitoring are presented in Table 6 and further detailed in the September Monitoring Report (see Appendix A).

The laboratory analytical results for air quality were below the laboratory LOR for all analytes. A single detection of ethylbenzene was reported at a concentration approximately equal to the LOR at one location (AQM03). The results are summarised in Table 7 and further detailed in the September Monitoring Report (see Appendix A).

Table 6 September 2021 AQME weather conditions

Parameters	AQM01	AQM02	AQM03
Canister deployment			
Date / Time	14/09/2021 06:40	14/09/2021 06:50	14/09/2021 07:00
Wind speed	0.0 km/h		
Wind direction	N/A		
Temperature	24°C		
Canister collection			
Date / Time	14/09/2021 17:40	14/09/2021 17:50	14/09/2021 18:00
Wind speed	8.3 km/h		
Wind direction	North-westerly		
Temperature	29°C		

Table 7 Air quality monitoring results September 2021

Analyte	Assessment criteria (NEPM)	Unit	Sample pollutant concentration		
			AQM01	AQM02	AQM03
Benzene	0.010	ppb	<0.003	<0.003	<0.003
Toluene	3.766	ppb	<0.0075	<0.0075	<0.0075
Ethylbenzene	N/A	ppb	<0.004	<0.004	0.0039
o-Xylene	1.085	ppb	<0.004	<0.004	<0.004
m- & p- Xylenes	2.170	ppb	<0.008	<0.008	<0.008

N/A – No assessment criterion

4.2 May 2022 AQME results

The sampling was carried out starting approximately 0600 on 10 May 2022. At the time of canister deployment, the weather conditions were noted as warm, humid, sunny with calm, south-easterly winds.

Temperature, wind speed and wind direction were monitored with a calibrated, portable weather station. The results of this monitoring are presented in Table 8 May 2022 AQME Weather monitoring data Table 8 and further detailed in the September Monitoring Report (see Appendix A).

The laboratory analytical results for air quality were below the laboratory LOR for all analytes. The results are summarised in Table 9 and further detailed in the September Monitoring Report (see Appendix A).

Table 8 May 2022 AQME Weather monitoring data

Parameters	AQM01	AQM02	AQM03
Canister deployment			
Date / Time	10/05/2022 06:10	10/05/2022 06:15	10/05/2022 06:25
Wind speed	6.1 km/h		
Wind direction	SSE		
Temperature	26°C		
Canister collection			
Date / Time	10/05/2022 17:45	10/05/2022 17:50	10/05/2022 18:00
Wind speed	2.5 km/h		
Wind direction	NW		
Temperature	32°C		

Table 9 May 2022 air quality monitoring results

Analyte	Assessment criteria (NEPM)	Unit	Sample pollutant concentration		
			AQM01	AQM02	AQM03
Benzene	0.010	ppb	<0.003	<0.003	<0.004
Toluene	3.766	ppb	<0.0075	<0.0075	<0.0075
Ethylbenzene	N/A	ppb	<0.004	<0.004	<0.005
o-Xylene	1.085	ppb	<0.004	<0.004	<0.005
m- & p- Xylenes	2.170	ppb	<0.009	<0.009	<0.01
Naphthalene	N/A	ppb	<0.022	<0.021	<0.025
NA – no assessment criterion					

5. Oil sampling results

Samples of the oil were collected prior to the application day in April 2022 as per the conditions of EPL 218-01. An outline of these results is presented in Table 10. The full results are presented in Table 10.

Table 10 Oil assessment results

Analyte	Unit	LOR	Result
OC Pesticides			
Hexachlorobenzene	mg/kg	1.0	<30.0
Chlorinated Hydrocarbons	mg/kg	0.5	<30.0
PCBs	mg/kg	0.1	<0.2
SVOCs			
Hexachlorocyclopentadiene	mg/kg	2.5	<30.0
Hexachloroethane	mg/kg	0.5	<30.0
Hexachloropropylene	mg/kg	0.5	<30.0
Pentachlorobenzene	mg/kg	0.5	<30.0
VOCs	mg/kg	0.5	<30.0
PFAS - Sums			
Sum (PFHxS + PFOS)	µg/kg	0.01	<100
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)	µg/kg	0.01	<100
Sum of PFASs	µg/kg	0.01	<100
Sum of US EPA PFAS (PFOS + PFOA)	µg/kg	0.01	<100
Sum of WA DWER PFAS	µg/kg	0.05	<100

Due to matrix interference caused by dilution of the mixture the LOR was raised for each analyte. While the LOR for analytes is raised this is considered sufficient for the purpose of the assessment.

6. Data quality

6.1 Field QA/QC results assessment

In accordance with ASC NEPM quality control requirements, one pair of duplicate samples were collected and analysed per GME. These samples were collected alongside a nominated primary sample and analysed as a blind duplicate and split duplicate respectively.

During the September GME the chosen laboratory was unable to fulfil analysis on the blind and split duplicates. On this occasion the blind and split duplicates were both analysed in the same laboratory, rather than one duplicate being sent interlab.

Each monitoring report produced during this annual reporting period provides an assessment of both field and laboratory data quality. Laboratory results from duplicate pairs taken during specific GMEs are compared using the RPD method described in Section 2.3, with individual exceedances to the RPD acceptance limits discussed within the relevant monitoring report.

Across the annual reporting period there were no RPD values below the nominated data quality indicators. Overall, the data obtained can be considered of sufficient quality and reliability to fulfil the requirements of this investigation

and that the adopted groundwater sampling procedures are acceptable to maintain data quality and sample integrity.

6.2 Laboratory internal QA/QC results assessment

The analysis of matrix spikes, matrix spike duplicates, laboratory control samples and surrogates were undertaken by the laboratory. A review of laboratory quality control procedures adopted during this monitoring period is summarised below:

- All groundwater and air quality samples were received by the laboratory in acceptable condition, appropriately chilled and within the relevant holding times for the prescribed analysis.
- Samples were extracted and analysed by the laboratory within appropriate holding times.
- All matrix spike recoveries, matrix spike duplicates, surrogate spike recoveries and laboratory control sample recoveries were within acceptable range (laboratory's historical statistical range) except for the following:
 - TRH – Semivolatile Fraction (laboratory duplicate).
 - TRH – Semivolatile Fraction (matrix spike).

Individual laboratory QA/QC reports are presented within the certified laboratory documentation provided alongside each monitoring report (refer to Appendix A).

7. Assessment of exceedances to acceptance criteria

7.1 Groundwater quality assessment

Throughout this annual reporting period, the groundwater monitoring yielded several results that exceeded the adopted acceptance criteria defined in the EMP (2022). These results are summarised within the individual monitoring reports.

EPL 218-01 Clause 37 defines the non-compliance reporting requirements associated with exceedances to the adopted criteria. This clause requires DTC to notify NT EPA of individual exceedances that are reported three times in consecutive monitoring events (Clause 37.1), or over three times the relevant acceptance limit (Clause 37.2). As such, GHD provides summaries of the individual exceedances within each monitoring report to allow timely non-compliance notification from DTC to NT EPA, where required.

Individual exceedance results are presented in the monitoring reports, with non-compliance notification requirements also defined in each report, attached as **Error! Reference source not found.**

A summary of the non-compliance notifications has been submitted as an Annual Return Form to NT EPA by DTC for this annual reporting period. This Annual Return Form for this annual reporting period is attached as Appendix B.

In summary, the exceedances reported to groundwater quality acceptance limits at the Site generally occur for field water quality parameters (pH, EC, DO and turbidity) and dissolved metals. No exceedances have been reported for TRH or BTEX in groundwater during this annual reporting period.

7.2 Air-quality assessment

The September 2021 and May 2022 AQMEs reported air quality results below the acceptance criteria set in EPL 218. As such, no specific non-compliances have been issued to NT EPA regarding these results.

Further detail on the individual AQME results and a discussion of these is provided in each of the relevant monitoring reports within Appendix A.

8. Conclusions and recommendations

8.1 Conclusions

The groundwater monitoring and air quality monitoring undertaken during this annual reporting period has generally met the requirements of the EMP (GHD 2022) and EPL 218-01.

The GME and AQME results from this annual reporting period indicated that the track conditioning activity undertaken at the Darwin Turf Club approved under EPL 218-01, has not contributed significant hydrocarbon contamination to the surrounding environment and does not pose a significant health risk to the surrounding receptors.

Laboratory analytical results reported concentrations below the laboratory LOR for the majority of analytes, with detections only recorded for dissolved metals.

As per EPL requirements, DTC is required to notify NT EPA of specific non-compliances with the EPL. These values can be found within individual GME reports (see Appendix A). However, it is likely that trigger values exceedances reflect natural background conditions and responses to climatic effects rather than the application of oil. Groundwater and air quality monitoring will continue to be undertaken as per NT EPA requirements.

The waste oil analysis undertaken indicated concentrations of all analytes tested (*TPH, BTEX, PCBs, chlorinated hydrocarbons and PFAS*) were below the LOR. However, the elevated laboratory LORs did not allow for conclusive assessment of the oil components.

8.2 Recommendations

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.

Although the surrounding environment exhibits minimal to no impact from the track conditioning activities, groundwater, air quality and oil sampling should continue to be undertaken as per NT EPA and EMP requirements.

9. References

Australian Standards (1998). *Australian and New Zealand Guidelines for Water Quality: Sampling*, AS/NZS 5667.1, 1998.

GHD (2022). *Darwin Turf Club – Fannie Bay Racecourse Environmental Management Plan for the Application of Used Oil*.

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NEPC (1999). *National Environment Protection (Assessment of Site Contamination) Measure* (NEPM), 1999. Amended 2013 (ASC NEPM).

NEPC (1999). *National Environment Protection (Air Toxics) Measure* (NEPM), 1999. Amended 2013 (ASC NEPM).

NT EPA (2018). *Guideline for Reporting on Environmental Monitoring* (May 2016).

Appendices

Appendix A

Monitoring Reports: July 2021 – June 2022



Darwin Turf Club – EPL Monitoring

Groundwater and Air Monitoring Report

Darwin Turf Club Inc

19 October 2021



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Printed date	19/10/2021 1:26:00 PM
Last saved date	19 October 2021
File name	https://projectsportal.ghd.com/sites/pp11_04/darwinturfclubbeplmon/ProjectDocs/12526136-REP_A_Darwin Turf Club EPL Monitoring Report September 2021.docx
Author	Liam Spurr
Project manager	Liam Spurr
Client name	Darwin Turf Club Inc
Project name	Darwin Turf Club - EPL Monitoring
Document title	Darwin Turf Club – EPL Monitoring Groundwater and Air Monitoring Report
Revision version	Rev 0
Project number	12526136

Document status

Status Code	Revision	Author	Reviewer		Approved for issue		
			Name	Signature	Name	Signature	Date
S3	A	Liam Spurr	Terry Widdowson		Carlos Sylianteng		15/10/2021
S4	0	Liam Spurr	Terry Widdowson		Terry Widdowson		19/10/2021

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1. Introduction

1.1 Background

GHD Pty Ltd (GHD) was engaged by Darwin Turf Club Incorporated (DTC) to undertake groundwater and air quality environmental monitoring at the Darwin Turf Club Fannie Bay Racecourse ('the Site'). The monitoring of groundwater and air quality is a requirement of the Site's Environment Protection Licence (EPL), issued by the Northern Territory Environmental Protection Agency (NT EPA) (NT EPA, 2012).

This EPL (EPL 218) issued by NT EPA permits DTC to apply waste oil to the racecourse track soils as part of routine track conditioning processes. Measures associated with environmental protection are presented in the Fannie Bay Racecourse Environmental Management Plan (EMP) prepared by GHD in 2012 (GHD, 2012). The EPL includes specific clauses relating to monitoring specifications, control measures, reporting and non-compliance notification requirements.

The environmental monitoring requirements documented in EPL 218 prescribe the following:

- A groundwater monitoring event (GME) to be conducted up to two weeks prior to the oil application to the track.
- A second GME must be conducted within 48-hours after the oil has been applied to the track surface.
- Additionally, an air quality monitoring event (AQME) must be conducted on the day of oil application, capturing ambient air during the application period.

Additional specifications on the monitoring requirements including monitoring locations are documented in the EMP (GHD, 2012).

1.2 Purpose of this report

The purpose of this report is to document the results obtained from the two GMEs and an AQME conducted by GHD during the September 2021 monitoring period on behalf of DTC. This report fulfils, in part, the requirements of the EMP and EPL under which DTC operates the racecourse facility.

Specifically, in fulfilment of Clause 41 relating to monitoring reporting requirements, this report was prepared in accordance with the requirements of the Northern Territory Contaminated Land Guideline (NT EPA, 2017), and therefore includes:

- Project background and site details
- Details on the adopted methodologies for the AQME and GMEs
- Assessment criteria adopted for evaluation of monitoring results
- Laboratory and field data obtained from the recent investigations
- A comparison of the historical and recent results against the relevant assessment criteria
- Summary conclusions of monitoring results, including a brief evaluation of the reported exceedances to the assessment criteria
- Recommendations based on the results from this monitoring period.

1.3 Scope

The following scope of work was undertaken:

- Two groundwater monitoring events (GMEs) at seven groundwater bores as specified in the DTC Environmental Management Plan (EMP) (GHD, 2012). The GMEs were undertaken before and after track conditioning activities.
- One air quality sampling event at the three locations specified in EPL 218. The sampling was undertaken during track conditioning activities.
- Laboratory analysis of a sample of the oil mixture used for track conditioning.

- Preparation of a monitoring report (this report).

The environmental monitoring works were carried out in general accordance with:

- Australian and New Zealand Environmental Conservation Council (ANZECC), 1992. Australian and New Zealand Guidelines (ANZG) for the Assessment and Management of Contaminated Sites.
- Australian Standards, 1998. Australian and New Zealand Guidelines for Water Quality Sampling, Australian Standard: AS5667.1.
- National Environment Protection Council (NEPC), 1999. National Environment Protection (Assessment of Site Contamination) Measure (NEPM), Assessment of Site Contamination. Amended April 2013.
- GHD, 2012. Darwin Turf Club Fannie Bay Racecourse – Environmental Management Plan.

1.4 Limitations

This report: has been prepared by GHD for Darwin Turf Club Inc. and may only be used and relied on by Darwin Turf Club Inc. for the purpose agreed between GHD and Darwin Turf Club Inc. as set out in section 1 of this report.

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

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

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

GHD has prepared this report on the basis of information provided by Darwin Turf Club Inc. and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

Site conditions (including the presence of hazardous substances and/or site contamination) may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.

2. Site details

2.1 Site location and setting

The Site is located off Dick Ward Drive, Fannie Bay, approximately 4 km north of Darwin CBD. The site is bound by Dick Ward Drive to the north, stables and Douglas Street to the east, Playford Street and Wells Street to the south and west. Residential properties are present on Douglas Street, Playford Street and Wells Street. The Site covers approximately 47 hectares and comprises open space, a dirt racing track, grandstands, pavilions, car parks and stable yards.

A site layout plan was produced by GHD during the development of the EMP in 2012, showing groundwater and air quality monitoring locations. This plan is presented as Figure 1 on the following page.

2.1.1 Climate

The site is located in the wet-dry tropics and is subject to annual periods of flood and drought. The dry season extends from approximately March to September, typified by moderate temperatures, low humidity and winds predominately from the north and east. The wet season occurs for the remaining months and tropical cyclones, thunderstorms and monsoon rain with winds predominantly from the northwest are common, in association with high temperatures and humidity.

2.1.2 Geology and Hydrogeology

The superficial geology underlying the site comprises unconsolidated sand, ferruginous and clayey, sandy and gravelly soils underlain by Kaolinitic Claystone. The Department of Infrastructure, Planning and Environment (2003), Groundwater Resource of the Darwin Area Map, 1:25,000 indicates the site to be divided into two hydrogeological regimes. The southern portion of the site is shown to be underlain by a shallow, freshwater aquifer. The groundwater yield in this area is estimated at less than 0.5 litres per second, which appears to align well with historical groundwater sampling records.

The northernmost portion of the site is likely to be underlain by shallow groundwater which is brackish to saline and unsuitable for most uses with a yield less than 0.5 L/s (Ref. 3). It is likely that the groundwater towards the northern area of the site is subject to saline influence from the Ludmilla Creek estuary. At depth, approximately 40 to 80 m below ground level (BGL), the site is underlain by the regional aquifer, within the Upper Proterozoic Burrell Creek Formation. The Burrell Creek Formation is classified as a minor groundwater resource with a yield less than 0.5 L/s (Ref. 4).

2.1.3 Topography and drainage

The site is flat with the track elevation approximately 0.5 m above the surrounding ground level. Surface water drainage at the site generally flows from south to north. The closest surface water feature is Ludmilla Creek, situated approximately 500 m to the northeast of the site. Drainage from the track and grassed areas runs through stormwater drains into a mangrove area and ultimately into Ludmilla Creek which discharges into the Beagle Gulf.

3. Groundwater monitoring methodology

3.1 Overview

Two GMEs (numbers 8 and 9 since monitoring commenced in April 2020) were undertaken on 7 September (GME 8) and 15 September (GME 9) 2021 in accordance with EPL 218 requirements. Seven boreholes were monitored as identified in Table 1. A borehole location plan is included as Figure 1.

The weather at the time of the GMEs is summarised below. Data was gathered from Darwin Airport weather station (Station No.: 014015):

- GME 8 – sunny with a temperature of 33.2° Celsius (C). No rainfall was reported.
- GME 9 – sunny with a temperature of 32.5° C. Rainfall of 13.6 mm recorded on 14 September 2021.

Table 1 Groundwater sampling program

Bore ID	Location (in relation to race track)	Analytical suite
MW01	North	– Total Recoverable Hydrocarbons (TRH) – Benzene, Toluene, Ethylbenzene, o- & m- & p- Xylenes (BTEX) – Dissolved metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc)
MW02	North	
MW03	Northwest	
MW04	Northeast	
MW05	East	
MW06	South	
MW07	West	

3.2 Sampling protocol

During each GME, the following activities were completed at each groundwater bore location:

- Each bore was visually inspected, and the bore condition was noted.
- The bore cap was removed, and the headspace was immediately monitored using a calibrated photoionisation detector (PID).
- An initial standing water level (SWL) reading was measured using a calibrated interface probe.
- Groundwater sampling was undertaken using low flow sampling techniques comprising a peristaltic pump and flow cell with calibrated YSI Pro DSS water quality meter.
- Purging was undertaken until the water quality parameters listed in Table 2 stabilised according to the definitions defined by the Victorian EPA (2000) groundwater sampling guidelines.
- Samples were collected into laboratory supplied containers with appropriate preservative, as required.
- Samples for dissolved metals analysis were field filtered through a <0.45 µm disposable in-line filter.
- The samples were placed in chilled storage containers and transported under Chain of Custody (CoC) documentation to ALS Environmental for analysis.
- Additional quality assurance / quality control (QAQC) samples were collected to maintain data quality.

SWL, PID readings and field water quality parameters were measured using a calibrated interface probe, calibrated PID and calibrated YSI Pro DSS® water quality meter. The calibration certificates for this equipment are attached as Appendix A.

3.3 Assessment criteria

The DTC Environmental Management Plan (EMP) (GHD, 2012) documents assessment criteria for groundwater which are based on the ANZECC (2000) water quality guidelines for 95% Freshwater species protection. This guidance has since been superseded by the equivalent criteria documented in the Australian New Zealand Guidelines (ANZG) for Fresh and Marine Water Quality published in 2018.

The assessment criteria are summarised in Table 2.

Table 2 Groundwater assessment criteria

Parameter	Units	Assessment criteria
Field parameters		
pH	pH units	6.0 – 8.0
Temperature	°C	N/A
Turbidity	NTU	2 - 15
Electrical conductivity	µS/cm	20 - 250
Dissolved oxygen	% saturation	80 - 110
Laboratory analysis		
Dissolved metals		
Arsenic	mg/L	0.094
Cadmium	mg/L	0.0004
Chromium	mg/L	0.006
Copper	mg/L	0.0018
Lead	mg/L	0.0056
Mercury	mg/L	0.0019
Nickel	mg/L	0.013
Zinc	mg/L	0.015
BTEX		
Benzene	mg/L	0.3
Toluene	mg/L	0.3
Ethylbenzene	mg/L	0.005
Xylenes	mg/L	0.075
Total Recoverable Hydrocarbons (TRH)		
TRH (C10 – C36)	mg/L	0.6

4. Air quality monitoring methodology

One ambient air quality monitoring event (AQME) was undertaken on 14 September 2021 to coincide with the track conditioning activities. Three locations were monitored which are typically down-wind of the track area: AQM01, AQM02 and AQM03, see Figure 1.

The weather at the time of the AQME is summarised below (Darwin Airport weather station: 014015):

- Temperature - 31.9° C.
- Rainfall of 3.8 mm.
- Wind direction was north-westerly to calm, with gusts up to 25 km/h.

4.1 Sampling protocol

GHD commenced the air quality monitoring program at 06:40 on 14 September 2021. Portable canisters were placed at the three nominated sampling locations to collect a single round of air samples on the day of oil application to the track surface. The air monitoring used portable 6 L Summa® canisters, fitted with flow meters, to collect a single round of air samples. The Summa® canister draws a sample of air under vacuum and the flow meter controls the continuous intake of air for a period of 12 hours.

The Summa® canisters were then dispatched for analysis to Eurofins MGT, a NATA-accredited laboratory for analysis. At the time of deployment, the weather conditions were noted as: warm, humid, sunny with calm north-westerly winds.

Wind speed, wind direction, and temperature were measured during the application period with a calibrated ScarletTech™ anemometer fitted with a data recording device.

During the AQME, the following activities were completed at each sampling location:

- Portable canisters were calibrated for an ultra-low-level 12-hour fill time prior to setup.
- The pressure gauge on each of the canisters was checked to ensure a vacuum pressure of approximately -30 kPa within the canister, prior to sampling.
- The canisters were set up at each of sampling location prior to the commencement of track conditioning (oil application).
- At the time of deployment, the weather conditions were noted.
- The canisters were placed between 1.2 – 1.5 m above ground level.
- Once the canister fill period had expired, the cannisters were recovered and transported under CoC documentation to Eurofins MGT for laboratory analysis.
- The samples were analysed for BTEX compounds.
- A weather monitoring station was deployed during the air quality sampling period to collect data on wind speed and direction and temperature to inform the assessment of air quality samples. Wind data collected during this monitoring is presented within Appendix B.
- Samples were analysed by the receiving laboratory using a laboratory that is NATA-accredited for the analysis method.

4.2 Assessment criteria

Assessment criteria specified in the DTC EMP (GHD, 2012) have been derived from the National Environment Protection (Air Toxics) Measure (NEPM) (NEPC, 2013). The assessment criteria are summarised in Table 3.

Table 3 Air quality assessment criteria

Parameter	Units	Assessment criteria
BTEX		
Benzene	ppb	3
Toluene	ppb	1,000
Ethylbenzene	ppb	N/A
o-Xylene	ppb	250
m- & p- Xylenes	ppb	250

5. Quality control and assurance

5.1 Field quality control methods

All field works were undertaken by experienced Environmental Scientists in accordance with GHD's standard operating procedures and in general compliance with NEPM 2013 contamination sampling recommendations and requirements.

5.2 Blind and split duplicates

A single sample is divided into three separate sampling containers. The parent sample and the blind sample are sent anonymously to the primary project laboratory (ALS Environmental) with the split sample sent to the secondary laboratory (Eurofins MGT). Blind duplicates provide an indication of the analytical precision of the laboratory but are susceptible to influence by other factors such as sampling techniques and sample media heterogeneity. Split duplicate samples provide an indication of the repeatability of the results between laboratories.

One set of field duplicate samples (Field Duplicate and Interlab Duplicate) was collected and analysed as part of the QAQC analytical program. The precision of the data from these samples was assessed by calculating the Relative Percent Difference (RPD) between duplicate sample pairs, using the following formula:

$$RPD\% = \frac{|C_o - C_d|}{C_o + C_d} \times 100$$

C_o = Analyte concentration of the original sample

C_d = Analyte concentration of the duplicate sample

Nominal acceptance criteria of 30% and 50% were adopted for field duplicates of inorganics and organics, respectively. Blind and split duplicate samples should return RPDs within these criteria, however it is noted that the criteria will not always be achieved, particularly in heterogeneous media or when comparing low analyte concentrations. In the event RPD values exceed these limits, an explanation is offered for the source of these discrepancies in sample results.

5.3 Laboratory quality control methods

In addition to field QAQC procedures, the receiving laboratories also adopt internal QAQC procedures to ensure data quality and reliability. These procedures are required as part of their NATA-accreditation.

The nominated NATA accredited analytical laboratories (ALS Environmental and Eurofins MGT Laboratory) adopted their internal procedures and methods in accordance with their quality assurance systems. Results from these procedures are provided alongside the individual monitoring reports as appendices.

6. Groundwater monitoring results

6.1 Field observations and measurements

Bore condition notes are presented in Appendix B. Generally, the bore network is of variable condition. The majority of groundwater bores are broken at ground level but are still able to be sampled. MW01 and MW02 are currently unsuitable for monitoring due to blockages at ground level. Additionally, MW04 has significant damage to the casing at ground level, however groundwater at MW04 is still able to be sampled. MW06 and MW05 are the only groundwater bores with no apparent damage.

When gauging SWLs (in accessible bores) with an interface probe, non-aqueous phase liquid (NAPL) was not detected. PID readings obtained during gauging were within the acceptable limits defined by the EMP.

Water quality parameters were unable to be measured in MW01 and MW02 due to a blockage at ground level within the bore casing. The SWLs and water quality parameters for the remaining bores are recorded in Table 4. The full set of purge parameters are attached as Appendix B, for reference.

Table 4 **September 2021 Groundwater field parameters**

Bore ID	Bore depth (mbTOC)	SWL (mbTOC)	SWL (mbgl)*	Physical parameters					Comments/observations
				Temp (°C)	DO (%)	pH	EC (µS/cm)	Turbidity (NTU)	
GME 8									
MW01	Inaccessible – Blocked near ground level due to casing damage.								
MW02	Inaccessible – Blocked near ground level due to casing damage.								
MW03	4.64	3.248	2.438	32.1	2.9	5.85	545.0	66.11	High turbidity, red/brown colour, becoming clear. No odour, no sheen.
MW04	Casing damaged			32.2	4.0	5.73	24,974	0.00	Bore casing broken at ground level, top section blocked. Brown, high turbidity, becoming clear. No odour, no sheen.
MW05	5.47	5.061	4.441	30.6	78.4	6.61	96.6	356.14	Brown, high turbidity, clearing up. No odour, no sheen.
MW06	6.20	5.570	4.880	32.4	20.8	5.60	111.3	395.5	Red-brown, high turbidity, becoming clear, no odour, no sheen.
MW07	6.05	3.554	2.794	30.2	11.9	5.46	2,261	2.30	Clear, no turbidity, no odour, no sheen.
GME 9									
MW01	Inaccessible – Blocked near ground level due to casing damage.								
MW02	Inaccessible – Blocked near ground level due to casing damage.								
MW03	4.61	3.314	2.504	33.7	3.0	5.96	487.6	N/A	Brown-grey, medium turbidity, clearing up, no odour, no sheen.
MW04	5.09	2.870	1.870	32.6	5.7	5.63	22,088	N/A	SWL and bore depth measured through gap in broken casing at ground level. Clear, no turbidity, hydrogen sulphide odour, no sheen.
MW05	5.48	5.185	4.565	31.3	83.6	6.39	85.8	N/A	Low turbidity, no odour, no sheen, then clearing up.
MW06	6.64	5.624	4.934	32.3	22.6	5.56	94.7	N/A	Orange, very high turbidity, no odour, no sheen. Then high turbidity.
MW07	6.04	3.635	2.875	31.1	20.5	5.04	1,925	N/A	Clear, no turbidity, no odour, no sheen.

N/A – Turbidity (Field) was not recorded.

mbTOC – metres below top of casing

mbgl – metres below ground level

* – No survey data available. Top of casing heights estimated from manual measurements.

6.1.1 Pre-application GME field water quality parameters

A summary of the field parameters observed during the pre-application GME (GME 8) is provided below:

- Groundwater temperatures ranged between 30.2 and 32.4°C. These temperatures are typical of Top End groundwaters.
- DO concentrations ranged widely from anoxic to well-oxygenated, reporting values between 2.9 to 78.4 percent during GME 8.
- Field pH data indicates groundwater at the site was slightly to moderately acidic, ranging from 5.46 to 6.61 among the groundwater purge parameters. This pH is typical of groundwaters within shallow Top End aquifers.
- Turbidity field results ranged from 0.00 to 395.5 NTU. The highest turbidity level was recorded at MW06 with the lowest level at MW04.
- EC values ranged from 96.6 µS/cm in MW05 to 24,974 µS/cm in MW04. These values indicate that a wide range of salinities are present in groundwaters across the Site. The higher levels of EC indicate marine influence on the groundwater, while the lower EC values tend to represent a freshwater environment with less influence from seawater.

6.1.2 Post-application GME field water quality parameters

A summary of the field parameters observed during the post-application GME (GME 9) is provided below:

- Groundwater temperatures ranged between 31.1 and 33.7°C. These temperatures are typical of Top End groundwaters.
- DO concentrations ranged from anoxic to well-oxygenated, reporting values between 3.0 to 83.6 percent during GME 9.
- Field pH data indicates groundwater at the site was moderately acidic, ranging from 5.04 to 6.39 among the groundwater purge parameters. This pH is typical of groundwaters within shallow Top End aquifers.
- Turbidity (field) was not recorded during the GME 9 due to issues with the turbidity probe attached to the water quality meter. The issue was not able to be rectified within the required sampling timeframe (48 hours post-application).
- EC values ranged from 85.8 µS/cm in MW05 to 22,088 µS/cm in MW07. These values indicate that a wide range of salinities are present in groundwaters across the Site. The higher levels of EC indicate marine influence on the groundwater, while the lower EC values tend to represent a freshwater environment with less influence from seawater.

6.2 Laboratory results

Copies of the certified laboratory reports are attached as Appendix C. The results of the groundwater analysis are summarised in tables within Appendix D, presented against the relevant assessment criteria. Results for BTEX and TRH were not detected above the laboratory limit of reporting (LOR), with the majority of dissolved metals also reported below the laboratory LOR.

A summary of individual analyte exceedances to the acceptance criteria are presented in Table 5 below.

Table 5 GME results exceedance summary

Analyte	Assesment criteria (EMP, 2012)	Unit	Exceedance concentration									
			MW03	MW04	MW05	MW06	MW07	MW03	MW04	MW05	MW06	MW07
Dissolved metals			GME 8					GME 9				
Cadmium	0.0004	mg/L	<AC	0.0006	<AC	<AC	<AC	<AC	0.0005	<AC	<AC	<AC
Copper	0.0018	mg/L	0.1420	0.0040	0.058	0.0030	0.1440	0.002	0.0020	0.0020	<AC	0.0040
Nickel	0.013	mg/L	0.021	0.133	<AC	<AC	0.024	<AC	0.129	<AC	<AC	0.004
Zinc	0.015	mg/L	0.204	0.461	0.099	0.018	0.208	0.015	0.450	0.0196	0.015	0.022
Field water quality parameters			GME 8					GME 9				
Field pH	6.0 – 8.0	pH units	5.85	5.73	<AC	5.60	5.46	5.96	5.63	<AC	5.56	5.04
Electrical conductivity (EC)	20 – 250	µS/cm	545	24,974	<AC	<AC	2,261	487.6	22,088	<AC	<AC	1,925
Dissolved oxygen (DO)	80 – 110	%	2.9	4.0	78.4	20.8	11.9	3.0	5.7	<AC	22.8	20.5
Turbidity	2 – 15	NTU	66.1	0.00	356.14	395.5	<AC	N/A	N/A	N/A	N/A	N/A

<AC – Reported within the relevant assessment criteria

N/A – No data available

As per EPL requirements, DTC is required to notify NT EPA of specific non-compliances with the EPL. While not all individual exceedances to the assessment criteria constitute a non-compliance, the following EPL Clauses define DTC's non-compliance notification requirements:

- Clause 37.1: “an exceedance of a trigger value specified in Attachment A, B or C at an authorised monitoring point specified in Attachment A, B and C on three consecutive sampling occasions; and”
- Clause 37.2: “an exceedance of a trigger value specified in Attachment A, B or C at an authorised monitoring point specified in Attachment A, B and C on a single occasion where the parameter measures greater than or equal to three times or more the trigger value.”

Considering these non-compliance definitions, the results from the September 2021 monitoring period have been assessed and tabulated against these clause definitions. These are presented below in Table 6 and Table 7.

Table 6 *EPL Clause 37.1: NT EPA notifiable exceedances: three consecutive exceedances*

Bore ID	Parameter/Analyte:	pH	DO	EC	Turbidity	Copper	Nickel	Zinc
	Assessment criteria:	6.0-8.0 (pH units)	80-110 (%)	20-250 (µS/cm)	2.0-15 (NTU)	0.0018 (mg/L)	0.013 (mg/L)	0.005 (mg/L)
MW03	GME 7	5.21	0.8	491.5	Nil	Nil	Nil	Nil
	GME 8	5.85	2.9	545.0				
	GME 9	5.96	3.0	487.6				
MW04	GME 7	5.53	20.2	8,828	Nil	0.013	0.020	0.074
	GME 8	5.73	4.0	24,974		0.004	0.133	0.461
	GME 9	5.63	5.7	22,088		0.002	0.129	0.450
MW05	GME 7	Nil	Nil	Nil	Nil	0.009	Nil	Nil
	GME 8					0.058		
	GME 9					0.002		
MW06	GME 7	4.97	1.8	Nil	Nil	Nil	Nil	0.206
	GME 8	5.60	20.8					0.018
	GME 9	5.56	22.6					0.015
MW07	GME 7	4.45	31.6	331.4	Nil	0.010	Nil	Nil
	GME 8	5.46	11.9	2261		0.144		
	GME 9	5.04	20.5	1925		0.004		

Table 7 *EPL Clause 37.2: NT EPA notifiable exceedances: results greater than three times the assessment criteria*

Parameter/Analyte:	EC		DO		Copper		Nickel		Zinc	
	GME 8	GME 9	GME 8	GME 9	GME 8	GME 9	GME 8	GME 9	GME 8	GME 9
Assessment criteria:	20 – 250 µS/cm		80 – 110 %		0.0018 mg/L		0.013 mg/L		0.015 mg/L	
MW03	Nil	Nil	Nil	Nil	0.142	Nil	Nil	Nil	0.204	Nil
MW04	24,974	22,088	Nil	Nil	Nil	Nil	0.133	0.129	0.461	0.450
MW05	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	0.099	0.019
MW06	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
MW07	2,261	1,925	Nil	Nil	Nil	Nil	Nil	Nil	0.208	0.022

6.3 Field quality control

In accordance with NEPM (2013) quality control requirements, one pair of duplicate samples was collected and analysed across the two GMEs, achieving a 1:10 primary-to-duplicate pair sampling ratio. These samples were collected alongside a nominated primary sample and analysed as a blind duplicate and split duplicate respectively.

These results are summarised in Table 8 below. RPD calculations are presented in Appendix D.

Table 8 September 2021 GME QAQC sample summary

Parent sample	Duplicate sample	Laboratory	Analysis
MW04	Field Duplicate	ALS	– TRH – BTEX – 8 metals
	Interlab Duplicate	Eurofins	

The analytes had RPD values below the nominated data quality indicators for both GME 8 and GME 9. The overall dataset can be considered of sufficient quality and reliability to fulfil the requirements of this investigation.

6.4 Laboratory QAQC results

The analysis of matrix spikes, matrix spike duplicates, internal laboratory control samples and surrogates was undertaken by the laboratory. A summary of the laboratory quality control procedures is given below:

- All samples were received by the laboratory in good condition and chilled and within appropriate sample containers for analysis.
- Samples were extracted and analysed within appropriate holding times.
- The RPDs of the internal duplicated samples met the acceptable limits for all analytes.
- All matrix spike recoveries, matrix spike duplicates, surrogate spike recoveries, method blank recoveries and control sample recoveries were within acceptable range (laboratory's historical statistical range) except for the following:
 - TRH – Semivolatile Fraction (laboratory duplicate).
 - TRH – Semivolatile Fraction (matrix spike).

Laboratory QAQC reports are presented within the laboratory documentation in Appendix C.

7. Air quality monitoring results

7.1 Summary of air quality data

Weather data was collected through an on-site continuous weather monitoring device during the oil application period: 07:00 to 17:00 on 14 September 2021. These on-site weather monitoring results are summarised in Table 9. At the time of deployment, the weather conditions were noted as: warm, humid, sunny with calm to north-westerly winds.

Figure 2 displays the wind direction and speed over the 12-hour air quality monitoring period (14/09/2021 06:00 – 18:00) on a wind rose. Upon comparison with publicly available Darwin Airport weather data for the same period, it was noted that the wind speed and direction collected on site showed a similar pattern to the data collected at Darwin Airport (Station No.: 014015). The wind at both weather monitoring locations was predominantly between northerly and westerly, at recorded wind speeds up to 25 km/h. It is noted that the Darwin Airport station collects higher resolution wind direction data than the ScarletTech™ weather station used on-site.

The Darwin Airport wind rose is presented as Figure 3 alongside Figure 2 for comparison.

The weather data collected during the oil application period demonstrates the appropriate down-wind placement of the three air quality monitoring locations: AQM01, AQM02, AQM03 around the southern areas of the track.

Table 9 September 2021 AQME Weather monitoring data

Parameters	AQM01	AQM02	AQM03
Canister deployment			
Date / Time	14/09/2021 06:40	14/09/2021 06:50	14/09/2021 07:00
Wind speed	0.0 km/h		
Wind direction	N/A		
Temperature	24°C		
Canister collection			
Date / Time	14/09/2021 17:40	14/09/2021 17:50	14/09/2021 18:00
Wind speed	8.3 km/h		
Wind direction	North-westerly		
Temperature	29°C		

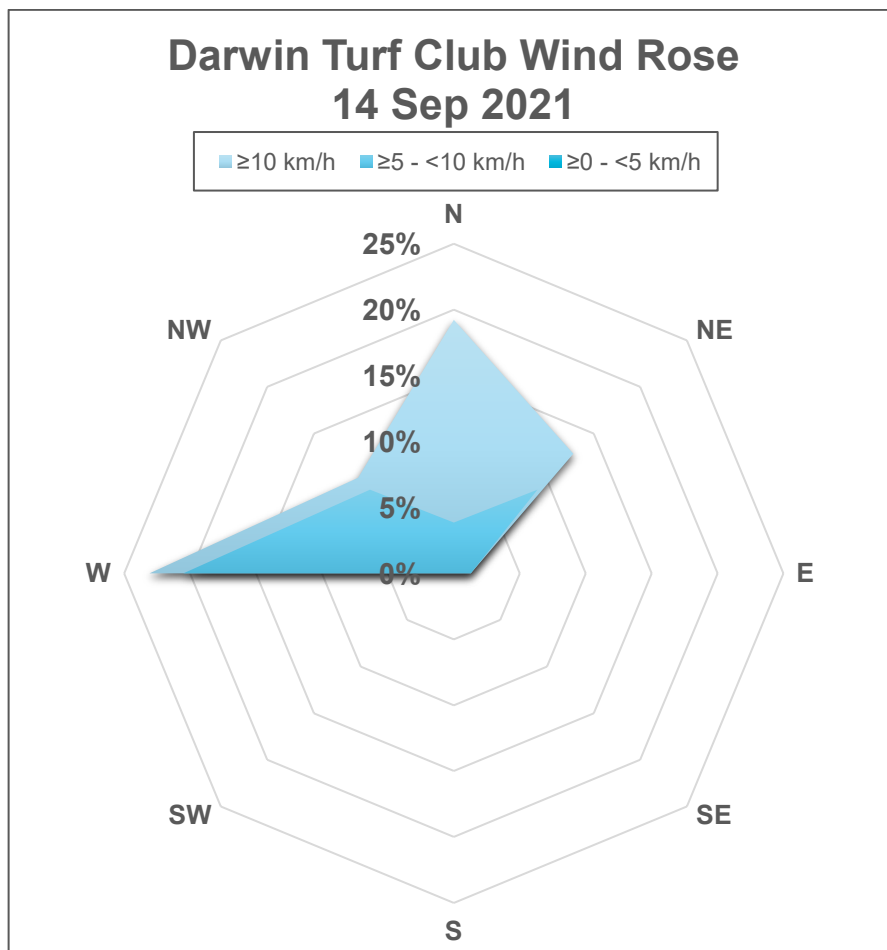


Figure 2 Darwin Turf Club - Wind direction and intensity during oil application

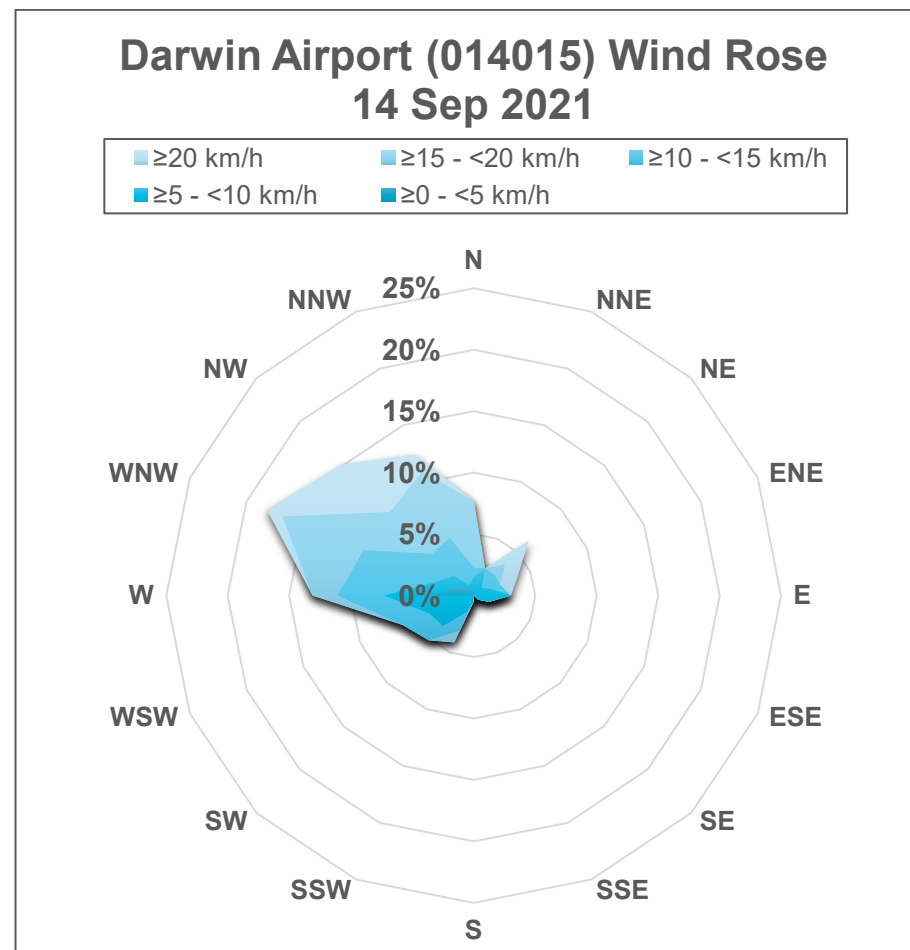


Figure 3 Darwin Airport - Wind direction and intensity during oil application

7.2 Laboratory results

Result for BTEX did not exceed the assessment criteria at all locations monitored. A single detection of Ethylbenzene was reported at a concentration approximately equal to the LOR at one location (AQM03). The results are summarised in Table 10.

Table 10 *September 2021 air quality monitoring*

Analyte	Assessment criteria (NEPM)	Unit	Sample pollutant concentration		
			AQM01	AQM02	AQM03
Benzene	0.010	ppb	<0.003	<0.003	<0.003
Toluene	3.766	ppb	<0.0075	<0.0075	<0.0075
Ethylbenzene	N/A	ppb	<0.004	<0.004	0.0039
o-Xylene	1.085	ppb	<0.004	<0.004	<0.004
m- & p- Xylenes	2.170	ppb	<0.008	<0.008	<0.008

N/A – No assessment criterion

8. Conclusions and recommendations

8.1 Conclusion

The groundwater monitoring and air quality monitoring undertaken during the September 2021 reporting period has generally met the requirements of the EMP (GHD 2012) and EPL 218. The GME and AQME results from this reporting period indicate that the track conditioning activity undertaken at the DTC under EPL 218 has not contributed significant hydrocarbon contamination to the surrounding environment.

The groundwater monitoring was undertaken during two events on 07 September and 15 September 2021 using the peristaltic pump sampling method, with the exception of two bores which were unable to be sampled due to blockages.

Field turbidity was not able to be measured during GME 9 due to issues with the turbidity probe within the water quality meter.

Laboratory analytical results reported concentrations below the laboratory LOR for the majority of analytes, with detections only recorded for dissolved metals.

Exceedances to the assessment criteria were similar to that of the previous monitoring period in April 2021, with the exception of the following:

- Comparing pre-application GMEs 6 (April 2021) and GME 8 (Sep 2021), Nickel and Zinc were detected more frequently in the September GME than during the April GME.
- Copper was generally detected at higher concentrations in the September GME 8 compared to the April GME 6.
- Cadmium was detected more regularly in September 2021 than April 2021, and showed two exceedances against the assessment criteria, both in MW04.
- Comparing post-application GMEs, Zinc was detected in all groundwater samples during the September GME 9 compared to only two bores during the April GME 7.
- No lead exceedances were reported during this monitoring period. Previous GMEs have occasionally reported exceedances for lead in groundwater

The air quality monitoring was carried out on 14 September 2021, coinciding with the application of the waste oil mixture to the track. Air quality monitoring program returned no detectable concentrations in all three samples. This indicates that there are no impacts to residents in relation to the air quality during the oil application and tilling practices within the vicinity of the Darwin Turf Club.

The groundwater and air monitoring results indicate that the track conditioning activity undertaken at the Darwin Turf Club approved under EPL 218 does not pose a significant health risk to the surrounding receptors.

As per EPL requirements, DTC is required to notify NT EPA of specific non-compliances with the EPL. While not all individual exceedances to the assessment criteria constitute a non-compliance, the following EPL Clauses define DTC's non-compliance notification requirements:

- Clause 37.1: "an exceedance of a trigger value specified in Attachment A, B or C at an authorised monitoring point specified in Attachment A, B and C on three consecutive sampling occasions; and"
- Clause 37.2: "an exceedance of a trigger value specified in Attachment A, B or C at an authorised monitoring point specified in Attachment A, B and C on a single occasion where the parameter measures greater than or equal to three times or more the trigger value."

Considering these non-compliance definitions, the results from the September 2021 monitoring period have been assessed and tabulated against these clause definitions. These are presented in Table 6 and Table 7 in Section 6.2.

8.2 Recommendations

Considering the results of this monitoring report and that of previous monitoring activities, the following recommendations are proposed:

- Several monitoring bores have damage to the casing which impact monitoring activities required by the EPL: MW01, MW02, MW03, MW04, MW07. As such, reinstatement of these monitoring bores or replacement installations should be completed prior to the next monitoring round in April 2022 to ensure the completeness and appropriateness of the groundwater monitoring network.
- Following any reinstatement or installation works, it is recommended that a survey be completed to determine the groundwater bore network elevation. This will facilitate accurate groundwater flow directions and depths to be determined in relation to a standardised datum, such as the Australian Height Datum (AHD).
- It is recommended that the historical environmental dataset be assessed to determine whether the recorded exceedances represent naturally occurring background concentrations. This may involve a comparison with publicly available groundwater data for the local area or broader Darwin region.
- Although the surrounding environment exhibits minimal to no impact from the track conditioning activities, groundwater and air quality monitoring should continue to be undertaken as per NT EPA and EMP requirements.

Appendices

Appendix A

Calibration Certificates

PID Calibration Certificate

Instrument PhoCheck Tiger
Serial No. T-115204



Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments			
Battery	Charge Condition	✓				
	Fuses	✓				
	Capacity	✓				
	Recharge OK?	✓				
Switch/keypad	Operation	✓				
Display	Intensity	✓				
	Operation (segments)	✓				
Grill Filter	Condition	✓				
	Seal	✓				
Pump	Operation	✓				
	Filter	✓				
	Flow	✓				
	Valves, Diaphragm	✓				
PCB	Condition	✓				
Connectors	Condition	✓				
Sensor	PID	✓	10.6 ev			
Alarms	Beeper	✓	Low	High	TWA	STEL
	Settings	✓	50ppm	100ppm		
Software	Version	✓				
Data logger	Operation	✓				
Download	Operation	✓				
Other tests:						

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Diffusion mode Aspirated mode

Sensor	Serial no	Calibration gas and concentration	Certified	Gas bottle No		Instrument Reading
PID Lamp		100ppm Isobutylene	NIST	190813		100.3 ppm

Calibrated by: Sandra Sanchez

Calibration date: 30/08/2021

Next calibration due: 26/02/2022

Appendix B

Field data tables



Appendix B
Table 1 - Groundwater Gauging

Darwin Turf Club
EPL Monitoring

Groundwater gauging

Well ID	Date/Time	Water Depth (mbTOC)	Well Depth (mbTOC)	Method	Dry	Comments	PID (ppm)
MW01	17/01/2020 12:30	-	0.78	Dip	Y	Well Dry	0.0
MW01	23/04/2020 11:21	-	0.78	Dip	Y	Well Dry	0.1
MW01	28/04/2020 10:58	-	0.78	Dip	Y	Well Dry	0.0
MW01	04/08/2020 11:58	-	0.78	Dip	Y	Well Dry	0.0
MW01	08/09/2020 10:00	-	0.77	Dip	Y	Well Dry	0.0
MW01	16/09/2020 09:33	-	0.77	Dip	Y	Well Dry	0.0
MW01	20/04/2021 13:30	-	0.78	Dip	Y	Well Dry	0.0
MW01	28/04/2021 11:44	-	0.78	Dip	Y	Well Dry	0.0
MW01	07/09/2021 11:30	-	-	Dip	Y	Well Dry	0.0
MW01	15/09/2021 11:25	-	-	Dip	Y	Well Dry	0.0
MW02	17/01/2020 12:31	0.941	1.78	Dip	N	Clear with organic matter, no odour, no sheen - Bail	0.0
MW02	23/04/2020 11:27	1.346	1.75	Dip	N	Clear, no odour, no sheen	0.0
MW02	28/04/2020 10:59	1.443	1.75	Dip	N	Clear, no odour, no sheen	0.0
MW02	04/08/2020 12:00	-	1.75	Dip	Y	Well Dry	0.0
MW02	08/09/2020 10:05	-	1.75	Dip	Y	Well Dry	0.0
MW02	16/09/2020 09:35	-	1.75	Dip	Y	Well Dry	0.0
MW02	20/04/2021 13:20	1.428	1.75	Dip	N	Insufficient water in the column to pruge and take samples	0.0
MW02	28/04/2021 11:40	1.523	1.75	Dip	N	Insufficient water in the column to pruge and take samples	0.0
MW02	07/09/2021 11:35	-	-	Dip	Y	Well Dry	0.0
MW02	15/09/2021 11:20	-	-	Dip	Y	Well Dry	0.0
MW03	17/01/2020 12:29	1.467	4.64	Dip	N	Unable to get bailer down well	0.0
MW03	23/04/2020 10:56	2.157	4.63	Dip	N	Clear, no odour, no sheen	0.1
MW03	28/04/2020 10:15	2.264	4.63	Dip	N	Clear, no odour, no sheen	1.2
MW03	04/08/2020 11:21	2.876	4.65	Dip	N	Slightly cloudy, no odour, no sheen	0.0
MW03	08/09/2020 11:37	3.040	4.64	Dip	N	Slightly cloudy, no odour, no sheen	0.0
MW03	16/09/2020 09:30	3.085	4.63	Dip	N	Pale brown cloudy, clearing up, no odour, no sheen	0.1
MW03	20/04/2021 12:56	2.690	4.64	Dip	N	Clear, no odour, no sheen, low turbidity	0.0
MW03	28/04/2021 11:50	2.789	4.68	Dip	N	Clear, no odour, no sheen, no turbidity	0.1
MW03	07/09/2021 11:55	3.248	4.64	Dip	N	High turbidity, Red/brown colour, no odour, becoming clear	0.2
MW03	15/09/2021 12:30	3.314	4.61	Dip	N	Brown-grey, medium turbidity, clearing up, no odour, no sheen.	0.2
MW04	17/01/2020 13:00	1.804	6.03	Dip	N	Orange/brown, moderate sediment load, no odour, no sheen	0.0
MW04	23/04/2020 12:07	2.081	6.07	Dip	N	Slightly cloudy/milky, no odour, no sheen	0.3
MW04	28/04/2020 11:44	1.965	6.07	Dip	N	Slightly cloudy/milky, no odour, no sheen	0.8
MW04	04/08/2020 12:05	2.605	6.03	Dip	N	Clear, no odour, no sheen	0.0
MW04	08/09/2020 11:37	-	-	Dip	N	Unable to get IP probe through bend in PVC piping. Water was white-red slightly cloudy, light sheen.	0.0
MW04	16/09/2020 11:07	2.968	5.04	Dip	N	Water slightly yellow-hazy, no odour, no sheen	0.0
MW04	20/04/2021 11:56	2.148	6.03	Dip	N	Bailer stuck in well. turbid initially (mostly due to disturbance of attempting to retrieve bailer). Yellow in colour. clearing after 0.5 L. Cloudy. low turbidity, no odour, no sheen.	3.7
MW04	28/04/2021 11:02	2.297	6.03	Dip	N	Clear, no odour, no sheen, no turbidity	1.3
MW04	07/09/2021 11:15	-	-	Dip	N	Bore blocked at ground level. High turbidity, becoming clear. No odour, no sheen	0.0
MW04	15/09/2021 11:30	2.870	5.09	Dip	N	SWL and Bore depth measured through gap in broken casing at ground level. Clear, no turbidity, H2S odour, no sheen	0.0
MW05	17/01/2020 13:30	3.325	5.48	Dip	N	Brown, slightly turbid, no odour. no sheen - Bailer	0.0
MW05	23/04/2020 13:08	3.759	5.47	Dip	N	Clear, no odour, no sheen	0.0
MW05	28/04/2020 12:40	3.781	5.47	Dip	N	Clear, no odour, no sheen	0.1
MW05	04/08/2020 12:48	3.809	5.48	Dip	N	Clear, no odour, no sheen	0.0
MW05	08/09/2020 12:11	3.932	5.47	Dip	N	Clear, no odour, no sheen	0.0
MW05	16/09/2020 09:20	3.854	4.47	Dip	N	Clear, no odour, no sheen	0.0
MW05	20/04/2021 11:26	3.921	5.47	Dip	N	Clear, no odour, no sheen, no turbidity	0.2
MW05	28/04/2021 10:30	3.656	5.46	Dip	N	Clear, no odour, no sheen, no turbidity	0.2
MW05	07/09/2021 10:40	5.061	5.47	Dip	N	High turbidity Initially - Brown in colour, clearing up	0.2
MW05	15/09/2021 10:50	5.185	5.48	Dip	N	Low turbidity, no odour, no sheen, then clearing up	1.1
MW06	17/01/2020 14:10	3.468	6.60	Dip	N	Cloudy brown, moderate sediment load, no odour, no sheen - Bailer	0.2
MW06	23/04/2020 09:03	4.376	6.61	Dip	N	Clear, no odour, no sheen	0.0
MW06	28/04/2020 08:47	4.418	6.61	Dip	N	Clear, no odour, no sheen	0.8
MW06	04/08/2020 08:52	5.244	6.60	Dip	N	Clear, no odour, no sheen	0.0
MW06	08/09/2020 12:55	5.481	6.58	Dip	N	Clear, no odour, no sheen	0.0
MW06	16/09/2020 09:15	3.824	6.60	Dip	N	Clear, no odour, no sheen	0.0
MW06	20/04/2021 10:47	4.405	6.59	Dip	N	High turbidity initially, cleared after 200ml (tubing at base of well, then raised up higher). Clear, no odour, no sheen, no turbidity	0.2
MW06	28/04/2021 09:00	4.540	6.53	Dip	N	Cloudy (yellowish brown), no odour, no sheen, low turbidity. Clear by 0.5 L	0.2
MW06	07/09/2021 12:30	5.570	6.20	Dip	N	High turbidity - red/brown colour. Becoming clear	0.2
MW06	15/09/2021 09:37	5.624	6.64	Dip	N	Orange, very high turbidity, no odour, no sheen. Then high turbidity	0.8
MW07	17/01/2020 10:40	2.529	6.04	Dip	N	Bore bent, unable to get bailer down well	0.5
MW07	23/04/2020 10:01	2.869	6.05	Dip	N	Clear, no odour, no sheen	0.8
MW07	28/04/2020 09:36	2.984	6.05	Dip	N	Clear, no odour, no sheen	0.1
MW07	04/08/2020 10:02	3.605	6.03	Dip	N	Clear, no odour, no sheen	0.0
MW07	16/09/2020 09:02	3.824	6.05	Dip	N	Clear, no odour, no sheen	0.1
MW07	20/04/2021 09:55	2.948	6.04	Dip	N	Clear, no odour, no sheen, no turbidity	0.6
MW07	28/04/2021 09:44	3.053	6.04	Dip	N	Clear, no odour, no sheen, no turbidity	0.3
MW07	08/09/2020 13:42	3.774	6.01	Dip	N	Clear, no odour, no sheen	0.0
MW07	07/09/2021 09:40	3.554	6.05	Dip	N	Clear, no turbidity, no odour, no sheen	0.1
MW07	15/09/2021 08:25	3.635	6.04	Dip	N	Clear, no turbidity, no odour, no sheen	0.0



Appendix B
Table 2 - Stabilisation Results

Darwin Turf Club
EPL Monitoring

Stabilisation Results

Well ID	Sampled Date/Time	Time	Purge Vol. (L)	Purge SWL (mbTOC)	pH Field (pH Units)	EC Field (µS/cm)	DO Field (mg/L)	DO Field (%S)	OPR Field (mV)	Temp Field (°C)	Turbidity Field (NTU)
MW02	17/01/2020 12:59	12:36:00	1.0	0.951	6.28	609	0.81	11.4	-33.8	33.1	-
		12:38:00	2.0	0.959	6.18	647	0.81	11.5	-31.0	33.9	-
		12:40:00	3.0	0.959	6.08	506	1.33	29.3	-20.7	34.8	-
		12:42:00	4.0	0.959	5.89	498.6	1.91	27.7	1.4	34.8	-
		12:45:00	5.0	0.959	5.84	510	1.91	27.6	10.3	34.8	-
		12:47:00	6.0	0.959	5.86	505	1.87	27.4	11.3	34.8	-
MW02	23/04/2020 11:45	11:35:06	0.5	1.530	6.04	520	1.26	17.9	42.2	34.3	54.67
		11:37:34	1.0	1.483	5.85	531	0.83	11.8	41.2	34.8	29.10
		11:40:35	1.5	1.472	5.56	535	0.41	6.0	59.2	34.8	2.13
		11:42:30	2.0	1.472	5.51	531	0.38	5.4	65.7	34.8	0.39
		11:45:09	2.5	1.472	5.46	528	0.37	5.6	68.0	34.8	0.00
MW02	28/04/2020 11:29	11:09:43	0.5	1.563	5.78	520	1.23	17.1	44.4	33.9	12.00
		11:13:06	1.0	1.520	5.58	510	0.83	11.8	54.9	34.2	4.70
		11:17:20	1.5	1.515	5.52	504	0.60	8.5	66.3	34.2	0.00
		11:21:16	2.0	1.516	5.50	497.5	0.59	8.3	74.7	34.2	0.00
		11:25:16	2.5	1.519	5.47	492.3	0.58	8.3	80.8	34.2	0.00
		11:29:08	3.0	1.521	5.45	490.1	0.59	8.3	84.1	34.2	0.00
MW03	23/04/2020 11:10	11:04:51	0.5	2.158	4.73	581	0.88	12.4	206.9	34.0	22.5
		11:06:38	1.0	2.158	4.75	584	0.93	13.2	209.8	34.0	22.09
		11:08:30	1.5	2.158	4.76	582	0.93	13.2	209.8	34.0	21.61
		11:10:24	2.0	2.158	4.76	582	0.93	13.2	209.4	34.0	20.90
MW03	28/04/2020 10:36	10:23:55	0.5	2.264	4.61	588	0.75	10.4	236.0	33.9	0.00
		10:26:21	1.0	2.264	4.63	588	0.53	7.4	236.2	33.8	0.00
		10:29:49	1.5	2.264	4.66	587	0.40	5.5	236.6	33.8	0.00
		10:32:34	2.0	2.264	4.65	587	0.37	5.2	237.2	33.8	0.00
		10:36:02	2.5	2.264	4.67	586	0.36	5.0	236.7	33.8	0.00
MW03	04/08/2020 11:46	11:36:08	0.5	2.877	5.05	437.0	0.95	13.4	205.4	32.9	33.42
		11:39:03	1.0	2.877	5.03	408.2	0.42	5.8	218.1	32.9	22.22
		11:41:38	1.5	2.877	5.03	406.7	0.34	4.8	221.8	32.8	15.25
		11:43:47	2.0	2.877	5.03	406.4	0.28	3.9	226.1	32.8	10.10
		11:45:25	2.5	2.878	5.02	406.3	0.28	3.8	227.9	32.8	9.310
		11:47:13	3.0	2.878	5.02	406.4	0.29	4.0	229.0	32.8	9.56
MW03	08/09/2020 10:28	10:28:00	1.0	3.046	4.86	417.3	0.25	3.7	206.1	33.5	6.07
		10:33:00	2.0	3.045	4.84	419.1	0.00	0.0	203.7	33.5	15.01
		10:38:00	3.0	3.049	4.79	423.3	0.00	0.0	202.0	33.5	3.80
		10:42:00	4.0	3.049	4.79	423.5	0.00	0.0	200.3	33.5	2.06
		10:46:00	5.0	3.048	4.80	422	0.00	0.0	201.9	33.7	0.54
		10:48:00	6.0	3.048	4.80	422.9	0.00	0.0	201.4	33.7	0.89
		10:53:00	7.0	3.049	4.81	422.8	0.00	0.0	202.1	33.6	1.00
MW03	16/09/2020 10:08	09:50:00	0.1	3.082	6.00	960	14.30	0.98	-9.3	33.3	2184.11
		09:54:00	0.5	3.083	5.76	921	0.00	0.0	-8.3	33.9	911.17
		09:57:00	1.0	3.085	5.62	896	0.00	0.0	-1.8	34.0	489.0
		10:01:00	1.5	3.085	5.59	491	0.00	0.0	1.0	33.8	2460
		10:03:00	2.0	3.085	5.59	510	0.00	0.0	0.6	34.0	2301
		10:06:00	2.5	3.085	5.60	529	0.00	0.0	-0.2	33.9	2197
MW03	20/04/2021 13:15	01:04:00	0.5	4.695	5.25	492.0	0.09	1.2	166.1	32.8	0.98
		01:06:00	1.0	4.696	5.22	488.7	0.07	0.9	171.5	32.9	1.00
		01:08:00	1.5	4.696	5.19	483.6	0.05	0.7	179.8	32.8	0.86
		01:10:00	2.0	4.696	5.20	484.0	0.04	0.5	181.2	32.8	0.73
		01:12:00	2.5	4.696	5.22	481.1	0.03	0.5	183.2	32.8	0.79
MW03	28/04/2021 12:15	11:58:07	0.5	2.791	5.52	781	1.39	19.8	177.2	33.0	0.08
		12:02:07	1.0	2.792	5.30	512	0.28	4.0	184.2	32.8	1.21
		12:04:07	1.5	2.792	5.22	499.3	0.19	2.6	193.5	32.8	1.49
		12:06:07	2.0	2.793	5.20	497.1	0.11	1.5	198.9	32.8	1.64
		12:08:07	2.5	2.793	5.21	493.9	0.07	0.9	201.3	32.8	1.72
		12:10:07	3.0	2.793	5.21	492.3	0.06	0.8	203.2	32.8	1.76
		12:12:07	3.5	2.793	5.21	491.5	0.06	0.8	204.2	32.8	1.80
MW03	07/09/2021 11:55	11:55:00	0.5	3.258	6.41	563	0.24	3.3	29.3	32.7	2037
		12:00:00	1.0	3.259	6.21	551	0.23	3.2	54.3	32.3	759.0
		12:05:00	1.5	3.260	6.02	545	0.27	3.7	81.2	32.1	342.65
		12:10:00	2.0	3.251	5.89	547	0.31	4.3	107.4	32.2	107.66
		12:15:00	2.5	3.252	5.88	543	0.23	3.1	126.5	32.1	70.70
		12:20:00	3.0	3.252	5.86	544	0.21	3.0	131.3	32.1	58.77
		12:25:00	3.5	3.260	5.85	545	0.22	2.9	133.6	32.1	66.11
MW03	15/09/2021 12:30	12:30:00	0.5	3.316	6.41	583	0.30	4.3	48.9	33.4	-
		12:35:00	1.0	3.316	6.17	527	0.28	4.0	68.7	33.4	-
		12:40:00	1.5	3.316	6.01	502	0.23	3.3	91.8	33.4	-
		12:45:00	2.0	3.316	6.17	495.1	0.18	2.5	76.7	33.3	-
		12:50:00	2.5	3.316	6.09	491	0.19	2.6	79.6	33.5	-
		12:55:00	3.0	3.316	6.01	487.6	0.20	2.7	86.9	33.5	-
		13:00:00	3.0	3.316	5.98	487.4	0.20	2.9	93.7	33.5	-



Appendix B
Table 2 - Stabilisation Results

Darwin Turf Club
EPL Monitoring

Well ID	Sampled Date/Time	Time	Purge Vol. (L)	Purge SWL (mbTOC)	pH Field (pH Units)	EC Field (µS/cm)	DO Field (mg/L)	DO Field (%S)	OPR Field (mV)	Temp Field (°C)	Turbidity Field (NTU)
MW04	17/01/2020 13:20	13:03:00	1.0	2.174	5.41	9691	4.08	56.8	126.9	31.7	-
		13:05:00	2.0	-	5.34	10356	4.17	59.5	137.8	31.8	-
		13:07:00	3.0	2.566	5.06	15173	3.12	45.4	156.6	32.0	-
		13:09:00	4.0	-	4.99	17340	2.05	31.9	187.3	32.3	-
		13:12:00	6.0	2.830	4.99	13930	2.03	31.0	189.3	32.3	-
		13:15:00	8.0	-	5.06	13225	2.07	32.4	189.3	32.3	-
		13:18:00	10.0	-	5.09	13025	2.09	32.4	191.7	32.3	-
		13:20:00	11.0	-	5.11	12521	2.06	32.1	193.3	32.3	-
MW04	23/04/2020 12:41	12:26:40	0.5	1.949	4.83	13350	1.59	23.1	214.6	33.7	87.86
		12:28:49	1.0	1.963	4.97	11288	1.51	21.9	217.4	33.6	85.43
		12:30:50	1.5	1.965	5.05	9530	1.51	21.8	217.5	33.6	85.32
		12:32:28	2.0	1.964	5.08	7500	1.48	21.2	217.3	33.6	85.47
		12:36:24	3.0	1.964	5.18	6430	1.44	20.7	215.4	33.6	53.69
		12:39:04	3.5	1.965	5.20	6366	1.46	20.8	214.2	33.6	50.41
		12:41:01	4.0	1.966	5.23	6273	1.41	20.1	213.1	33.6	46.79
MW04	28/04/2020 12:24	11:55:39	0.5	2.037	4.47	23696	0.63	9.4	237.4	33.2	13.14
		11:58:45	1.0	2.037	4.59	23663	0.53	8.0	246.7	33.3	4.81
		12:02:58	1.5	2.037	4.71	19250	0.57	8.4	251.7	33.3	3.00
		12:06:01	2.0	2.037	4.73	15003	0.62	9.0	249.4	33.3	0.92
		12:09:37	2.5	2.037	4.86	11724	0.69	9.9	245.9	33.3	1.68
		12:12:02	3.0	2.037	4.99	9581	0.78	11.2	241.1	33.3	2.52
		12:15:07	3.5	2.037	5.03	8491	0.82	11.8	237.8	33.3	3.31
		12:18:21	4.0	2.037	5.10	7352	0.93	13.3	234.6	33.3	3.55
		12:20:28	4.5	2.037	5.13	6922	0.95	13.6	232.8	33.3	3.97
		12:22:18	5.0	2.037	5.15	6875	0.98	14.0	231.0	33.3	4.95
		12:24:03	5.5	2.037	5.18	6729	1.04	14.8	229.2	33.3	5.06
MW04	04/08/2020 12:34	12:15:11	0.50	2.753	4.86	16623	2.13	30.2	294.8	32.0	4.01
		12:18:32	1.0	2.796	4.98	13810	2.24	32.1	300.0	31.9	3.62
		12:21:06	1.5	2.834	4.96	13554	1.44	20.5	303.1	31.9	4.35
		12:23:43	2.0	2.875	5.01	12026	1.06	15.1	304.1	31.9	4.06
		12:25:26	2.5	2.888	5.05	11123	0.88	12.3	303.8	31.9	4.13
		12:27:10	3.0	2.897	5.07	10237	0.85	12.0	303.9	31.9	4.18
		12:30:13	3.5	2.899	5.09	10062	0.81	11.6	302.6	31.9	4.25
		12:32:51	4.0	2.899	5.11	9850	0.80	11.3	302.6	31.9	4.56
MW04	08/09/2020 11:39	11:18:00	0.1	-	4.59	19058	0.84	12.8	235.1	33.3	330.90
		11:21:00	1.0	-	4.61	18855	0.32	4.9	238.9	32.7	281.90
		11:25:00	2.0	-	4.63	18863	0.25	3.7	243.5	32.6	38.90
		11:30:00	3.0	-	4.45	18450	0.15	2.2	146.4	32.6	385.10
		11:34:00	4.0	-	4.65	18610	0.17	2.8	247.8	32.5	299.30
		11:37:00	5.0	-	4.65	18810	0.17	2.8	247.2	32.5	301.90
MW04	16/09/2020 11:07	10:45:00	0.1	3.039	4.49	21623	7.70	0.5	213.0	33.3	30.72
		10:47:00	0.5	3.115	4.49	21250	3.30	0.20	221.7	33.4	52.41
		10:50:00	1.0	3.186	4.49	21233	-1.10	-0.08	224.9	33.1	80.71
		10:55:00	1.5	3.218	4.51	21436	-1.70	-0.12	226.0	33.9	62.13
		10:58:00	2.0	3.244	4.51	21031	-2.30	-0.16	225.3	33.2	90.10
		11:01:00	2.5	3.307	4.52	20977	-2.50	-0.18	224.9	33.2	76.10
		11:05:00	3.0	3.376	4.52	20888	-2.39	-0.16	225.9	33.2	63.10
MW04	20/04/2021 12:20	12:04:00	0.5	2.259	5.41	14928	3.53	51.9	167.2	33.4	255.0
		12:07:00	1.0	2.269	5.31	14811	2.71	39.6	162.6	33.4	360.0
		12:11:00	1.5	2.272	5.36	13138	2.37	34.3	158.8	33.5	109.0
		12:13:00	2.0	2.275	5.47	9833	2.36	34.2	150.7	33.5	0.17
		12:15:00	2.5	2.277	5.52	8487	2.09	30.1	148.9	33.5	0.22
		12:16:00	3.0	2.287	5.57	7300	1.91	27.3	147.1	33.5	0.33
		12:18:00	3.5	2.283	5.59	7111	1.90	27.1	146.8	33.5	0.54
		12:20:00	4.0	2.280	5.63	7055	1.89	26.8	145.9	33.5	0.83
MW04	28/04/2021 11:30	11:07:00	0.5	2.385	4.72	23371	0.47	7.0	254.1	33.1	1.21
		11:12:00	1.0	2.408	4.94	20870	0.61	9.0	252.5	33.1	1.84
		11:14:00	1.5	2.404	4.99	20404	0.59	8.8	252.5	33.2	1.88
		11:16:00	2.0	2.401	5.03	19232	0.55	8.0	251.3	33.2	1.79
		11:18:00	2.5	2.411	5.20	14750	0.99	14.4	244.8	33.2	1.82
		11:20:00	3.0	2.406	5.27	12930	1.17	16.8	241.1	33.2	1.74
		11:24:00	3.5	2.408	5.47	8822	1.57	21.5	233.2	33.2	1.77
		11:26:00	4.0	2.409	5.49	8901	1.41	20.1	232.5	33.2	1.67
		11:28:00	4.5	2.408	5.53	8828	1.42	20.2	229.3	33.2	1.63
MW04	07/09/2021 11:15	11:20:00	0.2	-	5.24	24395	0.73	10.7	70.4	32.1	0.61
		11:25:00	0.4	-	5.32	24799	0.57	8.3	41.9	32.1	0.40
		11:30:00	0.6	-	5.54	24975	0.33	5.1	2.3	32.1	0.00
		11:35:00	0.8	-	5.59	24992	0.31	4.8	-3.8	32.1	0.00
		11:40:00	1.0	-	5.61	24995	0.28	4.5	-6.0	32.1	0.00
		11:45:00	1.2	-	5.73	24974	0.25	4.0	-9.1	32.2	0.00
MW04	15/09/2021 11:40	11:40:56	0.5	2.070	5.59	22187	0.48	7.2	-25.6	32.6	-
		11:45:36	1.0	2.085	5.61	22165	0.45	6.8	-37.0	32.5	-
		11:50:00	1.5	2.097	5.61	22137	0.44	6.5	-47.0	32.7	-
		11:55:00	2.0	2.119	5.62	22110	0.42	6.3	-53.44	32.6	-
		12:00:00	2.5	2.13	5.63	22088	0.39	5.7	-60.9	32.6	-



Appendix B
Table 2 - Stabilisation Results

Darwin Turf Club
EPL Monitoring

Well ID	Sampled Date/Time	Time	Purge Vol. (L)	Purge SWL (mbTOC)	pH Field (pH Units)	EC Field (µS/cm)	DO Field (mg/L)	DO Field (%S)	OPR Field (mV)	Temp Field (°C)	Turbidity Field (NTU)
MW05	17/01/2020 13:50	13:35:00	2.0	3.705	6.64	157.8	4.65	56.6	143.0	31.1	-
		13:37:00	3.0	3.870	6.60	116.0	4.49	61.0	145.2	31.1	-
		13:39:00	4.0	4.021	5.97	115.0	4.48	66.7	148.5	31.2	-
		13:40:00	5.0	4.121	5.95	110.2	4.52	69.3	150.2	31.2	-
		13:42:00	6.0	4.252	5.93	107.3	4.56	69.3	153.5	31.2	-
MW05	23/04/2020 13:28	13:18:41	0.5	3.902	5.67	126.5	6.05	83.6	185.2	32.5	1.06
		13:20:39	1.0	3.961	5.65	102.5	6.05	83.5	190.5	32.5	1.04
		13:22:24	1.5	4.018	5.62	96.2	6.03	83.2	195.7	32.5	0.0
		13:25:34	2.0	4.077	5.60	95.1	5.95	82.2	201.9	32.5	0.0
		13:28:09	2.5	4.151	5.59	95.1	5.92	81.7	205.4	32.5	0.0
MW05	28/04/2020 13:14	12:51:41	0.5	3.915	5.80	152.0	6.23	85.9	181.4	32.4	0.0
		12:54:01	1.0	3.974	5.77	102.3	6.24	86.0	191.0	32.4	0.0
		12:58:40	1.5	4.064	5.73	92.8	6.22	85.6	198.9	32.4	0.0
		13:03:09	2.0	4.147	5.71	91.5	6.21	85.7	207.5	32.4	0.0
		13:08:41	2.5	4.226	5.68	91.5	6.27	86.6	211.6	32.4	0.0
		13:14:03	3.0	4.303	5.67	93.6	6.16	85.3	217.1	32.4	0.0
MW05	04/08/2020 13:08	12:57:58	0.5	3.944	6.36	184.5	7.09	95.4	251.8	31.0	2.08
		13:01:10	1.0	4.063	6.30	79.0	7.13	95.9	258.8	31.0	2.20
		13:03:51	1.2	4.112	6.29	78.30	7.13	95.9	260.3	31.0	2.24
		13:05:27	1.5	4.177	6.28	77.40	7.11	95.7	262.4	31.0	2.26
MW05	08/09/2020 12:11	11:58:00	0.1	3.978	6.05	288.6	7.01	98.4	150.6	33.5	2.17
		12:03:00	1.0	4.285	5.96	102.1	6.84	94.3	165.1	32.3	4.11
		12:07:00	2.0	4.310	5.96	109.8	6.83	92.0	167.0	32.3	4.81
		12:11:00	3.0	4.323	5.96	112.0	6.79	89.1	171.0	32.3	4.86
MW05	16/09/2020 11:46	11:26:00	0.1	3.934	6.11	161.7	6.69	97.1	107.0	33.6	0.92
		11:30:00	0.5	4.089	6.10	96.8	6.67	96.0	121.1	32.4	0.15
		11:35:00	1.0	4.141	6.09	97.7	6.95	96.7	119.8	33.1	2.90
		11:40:00	1.5	4.198	6.04	103.0	6.81	95.9	114.3	33.1	1.80
		11:44:00	2.0	4.219	6.04	110.4	6.95	96.8	116.9	33.1	1.27
MW05	20/04/2021 11:40	11:28:00	0.5	4.010	5.04	229.9	3.83	52.7	202.6	32.3	2.01
		11:30:00	1.0	4.140	4.90	228.6	4.08	56.3	223.8	32.1	2.12
		11:32:00	1.5	4.261	4.86	227.0	3.94	54.1	234.1	32.1	2.11
		11:34:00	2.0	4.364	4.87	230.9	3.72	51.1	238.0	32.2	2.08
		11:36:00	2.5	4.404	4.89	230.5	3.76	51.8	241.4	32.3	1.96
MW05	28/04/2021 10:50	10:37:00	0.5	3.835	5.82	101.6	6.25	85.1	204.8	31.7	5.30
		10:41:00	1.0	3.879	5.72	98.8	6.19	84.5	207.2	31.7	4.40
		10:43:00	1.5	3.972	5.66	97.9	5.96	81.4	210.2	31.8	0.60
		10:45:00	2.0	4.023	5.66	98.9	5.93	80.8	211.5	31.8	0.66
		10:47:00	2.5	4.076	5.66	99.4	5.91	80.7	212.6	31.8	0.67
MW05	07/09/2021 10:50	10:55:00	0.2	5.061	6.72	99.9	5.88	78.7	142.0	30.6	1191.81
		11:00:00	0.4	5.125	6.7	99.3	5.84	78.1	147.7	30.5	1011.82
		11:05:00	0.6	5.177	6.66	98.8	5.85	78.2	152.0	30.6	810.81
		11:10:00	0.8	5.191	6.64	96.4	5.88	78.4	160.1	30.6	330.31
		11:15:00	1.0	5.212	6.61	96.6	5.87	78.4	161.2	30.6	356.14
MW05	15/09/2021 10:55	10:55:00	0.5	5.205	6.49	87.1	6.39	86.5	141.1	31.3	-
		11:00:00	1.0	5.256	6.44	86.0	6.18	83.5	144.9	31.3	-
		11:05:00	1.5	5.361	6.39	86.0	6.23	84.0	150.1	31.3	-
		11:10:00	2.0	5.362	6.39	85.8	6.24	83.6	151.2	31.3	-



Appendix B
Table 2 - Stabilisation Results

Darwin Turf Club
EPL Monitoring

Well ID	Sampled Date/Time	Time	Purge Vol. (L)	Purge SWL (mbTOC)	pH Field (pH Units)	EC Field (µS/cm)	DO Field (mg/L)	DO Field (%S)	OPR Field (mV)	Temp Field (°C)	Turbidity Field (NTU)
MW06	17/01/2020 14:30	14:12:14	1.0	3.492	5.44	197.5	4.47	62.4	165.1	32.5	-
		14:13:04	2.0	3.495	5.15	203.0	4.30	62.0	189.9	32.4	-
		14:14:14	3.0	3.498	5.10	210.6	4.48	62.8	203.3	32.5	-
		14:15:24	4.0	3.502	5.08	220.7	4.41	61.9	211.6	32.5	-
		14:16:36	5.0	3.505	5.07	227.3	4.29	57.8	218.6	32.5	-
		14:17:53	6.0	3.510	5.05	232.2	4.28	60.0	221.5	32.5	-
MW06	23/04/2020 09:33	09:19:23	0.5	4.380	4.68	356.1	1.76	23.2	169.1	33.2	0.00
		09:22:45	1.0	4.381	4.64	355.0	0.74	10.2	186.8	33.0	0.00
		09:24:58	1.5	4.381	4.64	354.4	0.51	7.1	192.0	33.0	0.00
		09:27:38	2.0	4.381	4.63	353.2	0.43	6.2	198.5	33.0	0.00
		09:29:24	2.5	4.381	4.63	353.4	0.37	5.2	202.0	33.0	0.00
		09:31:28	3.0	4.382	4.64	353.3	0.36	5.0	205.4	33.0	0.00
		09:33:22	3.5	4.382	4.63	353.4	0.34	4.7	208.1	33.0	0.00
MW06	28/04/2020 09:11	08:58:36	0.5	4.422	4.71	291.5	0.63	8.7	156.7	32.1	0.46
		09:02:30	1.0	4.422	4.70	289.0	0.48	6.4	176.8	32.3	0.49
		09:05:56	1.5	4.423	4.69	289.8	0.36	5.0	192.1	32.4	0.69
		09:08:24	2.0	4.423	4.69	290.5	0.35	4.9	195.9	32.4	1.10
		09:11:27	2.5	4.423	4.69	290.9	0.33	4.6	201.9	32.4	1.56
MW06	04/08/2020 09:35	09:11:00	0.5	5.436	4.63	102.4	0.52	7.1	255.7	31.7	5.20
		09:17:00	1.0	5.565	4.65	102.3	0.43	5.9	268.2	31.7	10.54
		09:23:00	1.2	5.643	4.64	106.7	0.45	6.1	275.3	31.7	10.85
		09:27:00	1.5	5.683	4.62	107.9	0.44	6.0	280.1	31.7	10.95
		09:31:00	1.7	5.763	4.61	109.8	0.42	5.9	283.1	31.7	11.02
MW06	08/09/2020 12:58	12:41:00	0.1	5.625	4.32	107.4	1.91	27.7	220.0	35.3	12.21
		12:47:00	1.0	5.759	4.36	104.5	0.61	8.6	246.5	33.9	8.16
		12:49:00	1.5	5.750	4.35	106.1	0.60	7.9	251.3	33.7	8.01
		12:52:00	2.0	5.749	4.35	108.5	0.57	7.8	249.0	33.5	7.92
		12:55:00	2.5	5.745	4.35	107.9	0.57	7.7	245.1	33.5	7.94
MW06	16/09/2020 12:27	11:57:08	0.1	5.657	4.39	100.1	23.1	1.5	213.1	35.1	5.10
		11:57:40	0.5	5.758	4.38	91.7	26.6	1.8	223.8	35.2	59.11
		11:57:43	1.0	5.844	4.38	99.3	22.6	1.5	242.1	34.4	69.10
		11:57:46	1.5	5.939	4.35	96.1	18.7	1.3	241.0	34.0	49.80
		11:57:49	2.0	5.981	4.32	97.8	19.0	1.4	236.7	34.0	30.19
		11:57:52	2.5	6.028	4.32	103.9	20.2	1.4	249.8	34.1	12.10
MW06	20/04/2021 11:08	10:56:00	1.0	4.408	5.07	349.4	1.28	17.5	173.8	31.7	233.67
		10:58:00	1.5	4.408	4.99	353.8	1.13	15.5	183.3	31.6	0.57
		11:00:00	2.0	4.408	4.96	355.0	0.84	11.8	192.9	31.6	1.60
		11:02:00	2.5	4.408	4.93	356.4	0.78	10.7	200.0	31.6	1.85
		11:04:00	3.0	4.409	4.91	356.6	0.60	8.5	207.3	31.6	1.95
		11:06:00	3.5	4.409	4.91	355.8	0.53	7.5	211.0	31.6	1.96
		11:08:00	4.0	4.410	4.90	355.0	0.52	7.4	215.5	31.6	1.87
MW06	28/04/2021 09:22	09:10:36	0.5	4.545	4.89	345.5	0.42	5.7	198.6	31.0	2.02
		09:12:52	1.0	4.547	4.89	338.5	0.28	3.7	206.0	31.2	2.16
		09:14:48	1.5	4.547	4.96	338.6	0.21	2.8	209.1	31.2	2.17
		09:16:23	2.0	4.547	4.97	338.5	0.14	1.8	214.4	31.2	2.17
		09:18:05	2.5	4.547	4.97	337.8	0.13	1.8	217.2	31.2	2.16
		09:20:42	3.0	4.547	4.97	338.3	0.13	1.8	219.9	31.2	2.10
MW06	07/09/2021 12:40	12:40:00	0.2	5.725	6.09	109.7	1.40	19.4	175.1	32.4	659.75
		12:45:00	0.4	5.78	5.75	109.7	1.30	18.0	187.1	32.7	639.30
		12:50:00	0.6	5.885	5.74	106.9	1.17	15.8	167.3	32.5	803.00
		12:55:00	0.8	6.068	5.62	109.2	1.51	20.5	190.8	32.4	202.68
		13:00:00	1.0	6.070	5.58	110.9	1.62	22.2	198.2	32.3	181.25
		13:05:00	1.2	6.070	5.60	111.3	1.51	20.8	195.5	32.4	395.50
MW06	15/09/2021 09:40	09:40:00	0.5	5.633	6.23	95.5	1.54	21.3	139.4	32.6	-
		09:45:00	1.0	5.691	6.08	94.5	1.59	22.0	145.6	32.5	-
		09:50:03	1.5	5.727	5.88	93.2	1.66	22.9	156.2	32.3	-
		09:55:00	2.0	5.768	5.72	92.3	1.68	23.2	165.1	32.4	-
		10:00:00	2.5	5.792	5.58	91.9	1.65	22.6	179.2	32.3	-
		10:05:00	3.0	5.806	5.56	91.7	1.66	22.9	181.1	32.2	-
		10:10:00	3.5	5.821	5.57	94.1	1.64	22.6	181.6	32.1	-
		10:15:00	4.0	5.837	5.56	94.7	1.63	22.6	181.9	32.3	-



Appendix B
Table 2 - Stabilisation Results

Darwin Turf Club
EPL Monitoring

Well ID	Sampled Date/Time	Time	Purge Vol. (L)	Purge SWL (mbTOC)	pH Field (pH Units)	EC Field (µS/cm)	DO Field (mg/L)	DO Field (%S)	OPR Field (mV)	Temp Field (°C)	Turbidity Field (NTU)
MW07	23/04/2020 10:17	10:08:37	0.5	2.921	4.31	195.3	2.53	34.1	208.8	31.3	0.30
		10:10:15	1.0	2.930	4.27	176.6	2.45	32.9	218.9	31.1	0.31
		10:12:33	1.5	2.931	4.26	176.1	2.27	30.6	226.9	31.1	0.00
		10:15:08	2.0	2.932	4.25	177.7	2.35	31.6	232.0	31.1	-0.90
		10:17:05	2.5	2.932	4.24	176.4	2.32	31.3	236.0	31.1	0.00
MW07	28/04/2020 09:53	09:43:53	0.5	3.021	4.21	317.5	1.41	19.2	238.3	31.1	0.00
		09:46:04	1.0	3.022	4.22	212.0	1.93	26.1	244.1	31.1	0.00
		09:48:49	1.5	3.022	4.19	188.6	2.10	28.3	250.9	31.1	0.00
		09:50:54	2.0	3.023	4.18	186.9	2.10	28.3	254.2	31.1	0.00
		09:53:01	2.5	3.023	4.17	186.4	2.00	28.3	256.7	31.1	0.00
MW07	04/08/2020 10:48	10:21:28	0.5	3.760	4.65	1500	1.27	17.1	208.0	30.7	8.33
		10:27:42	1.0	3.846	4.74	1451	1.24	17.1	226.1	30.8	8.75
		10:33:24	1.5	3.931	4.75	1877	1.25	17.7	194.4	30.8	9.28
		10:39:55	2.0	4.095	4.79	1722	0.45	6.1	170.7	30.8	6.29
		10:43:33	2.5	4.193	4.82	1693	0.48	6.4	178.5	30.8	6.12
		10:47:12	3.0	4.264	4.81	1651	0.48	6.5	179.9	30.8	6.66
MW07	08/09/2020 13:43	13:33:00	0.1	3.891	4.57	2855	1.89	25	100.1	36.0	36.50
		13:35:00	0.5	4.150	4.53	2541	0.09	1.4	186.9	32.7	35.10
		13:37:00	1.0	4.071	4.53	2561	0.08	1.3	187.1	32.5	35.91
		13:40:00	1.5	4.103	4.52	2614	0.09	1.3	186.1	32.5	36.09
		13:42:00	2.0	4.121	4.53	2599	0.08	1.3	179.0	32.5	35.96
MW07	16/09/2020 13:26	11:59:42	0.1	3.914	4.24	2114	14.6	1.0	227.9	34.0	14.10
		12:00:16	0.5	4.050	4.07	1727	16.6	1.2	264.4	32.9	18.57
		12:00:20	1.0	4.138	4.07	1617	22.5	1.6	275.0	32.7	21.19
		12:00:23	1.5	4.198	4.07	1691	24.1	1.6	218.1	32.7	16.18
		13:24:00	2.0	4.263	4.07	1710	25.6	1.7	247.1	32.7	20.11
MW07	20/04/2021 10:32	10:12:39	0.5	3.007	5.12	2272	0.35	4.9	90.1	30.5	2.06
		10:14:09	1.0	3.019	4.97	1844	0.16	2.2	109.2	30.4	2.07
		10:16:42	1.5	3.024	4.83	1533	0.13	1.7	127.9	30.4	2.10
		10:18:18	2.0	3.027	4.64	1085	0.25	3.3	146.5	30.4	2.14
		10:20:23	2.5	3.030	4.59	692.0	0.66	8.4	158.2	30.4	2.16
		10:22:18	3.0	3.032	4.54	307.8	1.45	19.2	176.6	30.3	2.17
		10:24:14	3.5	3.034	4.49	283.9	1.53	20.3	191.4	30.3	2.18
		10:26:29	4.0	3.036	4.47	273.8	1.54	20.5	196.3	30.3	2.18
		10:28:06	4.5	3.037	4.46	281.8	1.54	20.5	199.9	30.3	2.18
MW07	28/04/2021 10:10	09:50:34	0.5	3.111	4.91	1729	1.56	21.3	184.9	30.2	1.96
		09:52:25	1.0	3.137	4.78	1633	0.25	3.4	183.9	30.4	2.10
		09:55:02	1.5	3.195	4.49	985.0	0.28	3.7	210.4	30.4	2.15
		09:58:41	2.0	3.228	4.48	620.0	0.74	9.5	219.1	30.4	2.14
		10:00:39	2.5	3.295	4.47	319.5	1.71	22.7	227.1	30.4	2.15
		10:02:24	3.0	3.329	4.45	324.7	2.22	29.0	229.2	30.4	2.14
		10:04:21	3.5	3.371	4.44	330.1	2.30	30.0	231.5	30.4	2.15
		10:06:36	4.0	3.399	4.45	331.4	2.32	31.6	233.5	30.4	2.14
MW07	07/09/2021 09:40	09:55:00	0.2	3.771	5.88	3096	1.97	22.2	58.6	30.0	21.03
		10:00:00	0.4	3.773	5.74	3005	0.59	7.8	88.1	30.2	23.59
		10:05:00	0.6	3.801	5.75	2676	0.38	5.1	116.2	30.2	21.79
		10:10:00	0.8	4.030	5.56	2404	0.43	5.8	157.0	30.1	11.32
		10:15:00	1.0	4.350	5.30	2178	1.20	16.0	226.8	30.2	5.59
		10:20:00	1.2	4.358	5.46	2262	0.90	11.9	210.4	30.2	2.22
		10:25:00	1.4	4.359	5.45	2260	0.88	11.8	210.2	30.2	2.31
		10:30:00	1.6	4.361	5.46	2261	0.89	11.9	210.5	30.2	2.30
MW07	15/09/2021 08:30	08:30:00	0.5	3.829	5.26	2974	0.87	11.6	147.6	30.7	-
		08:35:00	1.0	3.854	5.32	2787	0.60	8.2	155.1	30.8	-
		08:40:00	1.5	3.892	5.33	2701	0.51	6.9	157.2	30.8	-
		08:45:00	2.0	3.917	5.33	2558	0.44	6.0	159.4	30.8	-
		08:50:00	2.5	3.983	5.26	2391	0.42	5.7	167.0	30.9	-
		08:55:00	3.0	3.061	5.22	2290	0.43	5.8	174.4	31.0	-
		09:00:00	3.5	4.111	5.11	2139	0.61	8.1	189.5	31.0	-
		09:05:00	4.0	4.152	5.07	2055	0.71	9.7	198.2	31.0	-
		09:10:00	4.5	4.175	5.04	2000	0.91	12.2	203.7	31.0	-
		09:15:13	5.0	4.210	5.00	1865	1.61	21.7	213.4	30.9	-
		09:20:13	5.5	4.258	5.02	1889	1.67	22.7	215.5	31.0	-
		09:25:43	6.0	4.330	5.03	1915	1.59	21.5	216.5	31.0	-
		09:30:38	6.5	4.405	5.04	1925	1.52	20.5	216.0	31.1	-



Appendix B
Table 3 - Stabilisation parameters

Darwin Turf Club
EPL Monitoring

Stabilisation parameters

Well ID	Sampled Date/Time	Purge Vol L	Purge SWL m bTOC	pH Field pH Units	EC Field µS/cm	DO Field mg/L	DO Field %S	OPR Field mV	Temp Field °C	Turbidity Field NTU
MW02	17/01/2020 12:59	6.0	0.959	5.86	505.0	1.87	27.4	11.3	34.8	-
	23/04/2020 11:45	2.5	1.472	5.46	528.0	0.37	5.6	68.0	34.8	0.00
	28/04/2020 11:29	3.0	1.521	5.45	490.1	0.59	8.3	84.1	34.2	0.00
MW03	23/04/2020 11:10	2.0	2.158	4.76	582.0	0.93	13.2	209.4	34.0	20.90
	28/04/2020 10:36	2.5	2.264	4.67	586.0	0.36	5.0	236.7	33.8	0.00
	04/08/2020 11:46	3.0	2.878	5.02	406.4	0.29	4.0	229.0	32.8	9.56
	08/09/2020 10:53	7.0	3.049	4.81	422.8	0.00	0.0	202.1	33.6	1.00
	16/09/2020 10:08	2.5	3.085	5.60	529.0	0.00	0.0	-0.2	33.9	2197
	20/04/2021 13:15	2.5	4.696	5.22	481.1	0.03	0.5	183.2	32.8	0.79
	28/04/2021 12:15	3.5	2.793	5.21	491.5	0.06	0.8	204.2	32.8	1.80
	07/09/2021 11:55	3.5	3.26	5.85	545.0	0.22	2.9	133.6	32.1	66.11
	15/09/2021 12:30	4.0	3.316	5.96	487.6	0.21	3.0	102.9	33.7	-
MW04	17/01/2020 13:20	11	2.830	5.11	12521.0	2.06	32.1	193.3	32.3	-
	23/04/2020 12:41	4.0	1.966	5.23	6273.0	1.41	20.1	213.1	33.6	46.79
	28/04/2020 12:24	5.5	2.037	5.18	6729.0	1.04	14.8	229.2	33.3	5.06
	04/08/2020 12:34	4.0	2.899	5.11	9850.0	0.80	11.3	302.6	31.9	4.56
	08/09/2020 11:37	5.0	-153.500	4.65	18810.0	0.17	2.81	247.2	32.5	301.90
	16/09/2020 11:07	3.0	3.376	4.52	20888.0	0.00	0.00	225.9	33.2	63.10
	20/04/2021 12:20	4.0	2.280	5.63	7055.0	1.89	26.8	145.9	33.5	0.83
	28/04/2021 11:30	4.5	2.408	5.53	8828.0	1.42	20.2	229.3	33.2	1.63
	07/09/2021 11:15	1.2	-	5.73	24974	0.25	4.0	-9.1	32.2	0.00
	15/09/2021 11:40	2.5	2.130	5.63	22088	0.39	5.7	-60.9	32.6	-
MW05	17/01/2020 13:50	6.0	4.252	5.93	107.3	4.56	69.3	153.5	31.2	-
	23/04/2020 13:28	2.5	4.151	5.59	95.1	5.92	81.7	205.4	32.5	0.00
	28/04/2020 13:14	3.0	4.303	5.67	93.6	6.16	85.3	217.1	32.4	0.00
	04/08/2020 13:08	1.50	4.177	6.28	77.4	7.11	95.7	262.4	31.0	2.26
	08/09/2020 12:11	3.0	4.323	5.96	112.0	6.80	89.1	171.0	32.3	4.86
	16/09/2020 11:46	2.0	4.219	6.04	110.4	6.95	96.8	116.9	33.1	1.27
	20/04/2021 11:40	2.5	4.404	4.89	230.5	3.76	51.8	241.4	32.3	1.96
	28/04/2021 10:50	2.5	4.076	5.66	99.4	5.91	80.7	212.6	31.8	0.67
	07/09/2021 10:50	1.0	5.212	6.61	96.6	5.87	78.4	161.2	30.6	356.14
	15/09/2021 10:55	2.0	5.362	6.39	85.8	6.24	83.6	151.2	31.3	-
MW06	17/01/2020 14:30	6.0	3.510	5.05	232.2	4.28	60.0	221.5	32.5	-
	23/04/2020 09:33	3.5	4.382	4.63	353.4	0.34	4.7	208.1	33.0	0.00
	28/04/2020 09:11	2.5	4.423	4.69	290.9	0.33	4.6	201.9	32.4	1.56
	04/08/2020 09:35	1.75	5.763	4.61	109.8	0.42	5.9	283.1	31.7	11.02
	08/09/2020 12:55	2.5	5.745	4.35	107.9	0.57	7.79	245.1	33.5	7.94
	16/09/2020 12:27	2.5	6.028	4.32	103.9	20.2	1.43	249.8	34.1	12.10
	20/04/2021 11:08	4.0	4.410	4.90	355.0	0.52	7.4	215.5	31.6	1.87
	28/04/2021 09:22	3.0	4.547	4.97	338.3	0.13	1.8	219.9	31.2	2.10
	07/09/2021 12:40	1.2	6.070	5.60	111.3	1.51	20.8	195.5	32.4	395.5
	15/09/2021 09:40	4.0	5.837	5.56	94.7	1.63	22.6	181.9	32.3	-
MW07	23/04/2020 10:17	2.5	2.932	4.24	176.4	2.32	31.3	236.0	31.1	0.00
	28/04/2020 09:53	2.5	3.023	4.17	186.4	2.00	28.3	256.7	31.1	0.00
	04/08/2020 10:48	3.0	4.264	4.81	1651.0	0.48	6.5	179.9	30.8	6.66
	08/09/2020 13:42	2.0	4.121	4.53	2599.0	0.08	1.30	179.0	32.5	35.96
	16/09/2020 13:26	2.0	4.263	4.07	1710	25.6	1.72	247.1	32.7	20.11
	20/04/2021 10:32	4.5	3.037	4.46	281.8	1.54	20.5	199.9	30.3	2.18
	28/04/2021 10:10	4.0	3.399	4.45	331.4	2.32	31.6	233.5	30.4	2.14
	07/09/2021 09:40	1.6	4.361	5.46	2261.0	0.89	11.9	210.5	30.2	2.30
	15/09/2021 08:30	6.5	4.405	5.04	1925.0	1.52	20.5	216.0	31.1	-



**Appendix B - Table 4
Weather Monitoring Data**

Darwin Turf Club EPL Monitoring

Date	Time	Wind speed (average) (m/s)	Wind speed (maximum) (m/s)	Temperature (°C)	Wind direction (bearing)	Signal (dB)
14/09/2021	06:00:00	N/A	N/A	N/A	N/A	N/A
14/09/2021	06:10:00	N/A	N/A	N/A	N/A	N/A
14/09/2021	06:20:00	N/A	N/A	N/A	N/A	N/A
14/09/2021	06:30:00	N/A	N/A	N/A	N/A	N/A
14/09/2021	06:40:00	0	1.2	25	Calm	N/A
14/09/2021	06:50:00	0	0	24	Calm	N/A
14/09/2021	07:00:00	0	0	24	Calm	-49
14/09/2021	07:10:00	0	0	24	Calm	-49
14/09/2021	07:20:00	0	0	24	Calm	-49
14/09/2021	07:30:00	0	0	24	Calm	-48
14/09/2021	07:40:00	0	0	24	Calm	-48
14/09/2021	07:50:00	0	0	24	Calm	-48
14/09/2021	08:00:00	0	0	25	Calm	-48
14/09/2021	08:10:00	0	0.8	25	Calm	-48
14/09/2021	08:20:00	0	1.4	26	Calm	-49
14/09/2021	08:30:00	0	0.7	26	Calm	-49
14/09/2021	08:40:00	0.1	1.5	26	99	-49
14/09/2021	08:50:00	0	1.9	27	Calm	-49
14/09/2021	09:00:00	0	0	27	Calm	-48
14/09/2021	09:10:00	0	1.8	27	Calm	-48
14/09/2021	09:20:00	0	0	28	Calm	-48
14/09/2021	09:30:00	0	0	29	Calm	-48
14/09/2021	09:40:00	0	0.9	29	Calm	-48
14/09/2021	09:50:00	0	0	29	Calm	-48
14/09/2021	10:00:00	0	0	30	Calm	-46
14/09/2021	10:10:00	0	0	31	Calm	-46
14/09/2021	10:20:00	0	1.6	31	Calm	-47
14/09/2021	10:30:00	0.9	3	31	276	-47
14/09/2021	10:40:00	1.4	3.4	29	264	-47
14/09/2021	10:50:00	1	3.3	28	277	-47
14/09/2021	11:00:00	1.4	3	28	273	-43
14/09/2021	11:10:00	1.5	3.1	29	292	-43
14/09/2021	11:20:00	1	3.4	29	266	-43
14/09/2021	11:30:00	1.6	3.2	29	270	-43
14/09/2021	11:40:00	1.3	3.3	29	262	-43
14/09/2021	11:50:00	1.1	3	29	280	-43
14/09/2021	12:00:00	2	4.4	29	284	-43
14/09/2021	12:10:00	1.9	3.3	29	287	-43
14/09/2021	12:20:00	2.5	4	30	276	-43
14/09/2021	12:30:00	2.2	3.7	30	300	-43
14/09/2021	12:40:00	3	4.9	30	265	-43
14/09/2021	12:50:00	2.5	4.5	31	258	-43
14/09/2021	13:00:00	2.8	4.4	31	278	-43
14/09/2021	13:10:00	3.1	5	31	351	-43
14/09/2021	13:20:00	2.9	5.2	31	37	-43
14/09/2021	13:30:00	1.9	5.2	29	46	-44
14/09/2021	13:40:00	1.6	3.4	27	11	-44
14/09/2021	13:50:00	1.9	3.7	26	24	-45
14/09/2021	14:00:00	2.3	4	27	27	-50
14/09/2021	14:10:00	2.9	4.8	29	24	-50
14/09/2021	14:20:00	3.1	4.7	30	25	-50
14/09/2021	14:30:00	2.7	4.3	31	21	-50
14/09/2021	14:40:00	2.6	5.1	31	38	-50
14/09/2021	14:50:00	2.5	3.9	31	29	-50
14/09/2021	15:00:00	2.2	4	30	23	-49
14/09/2021	15:10:00	2.3	4.1	30	26	-49
14/09/2021	15:20:00	2.9	4.4	30	19	-49
14/09/2021	15:30:00	3.5	5	31	350	-49
14/09/2021	15:40:00	3.3	5.1	32	350	-49
14/09/2021	15:50:00	3.1	4.5	32	346	-50
14/09/2021	16:00:00	3.1	4.8	32	344	-46



Appendix B - Table 4
Weather Monitoring Data

Darwin Turf Club EPL Monitoring

Date	Time	Wind speed (average) (m/s)	Wind speed (maximum) (m/s)	Temperature (°C)	Wind direction (bearing)	Signal (dB)
14/09/2021	16:10:00	3	4.8	31	1	-47
14/09/2021	16:20:00	3	4.9	31	359	-47
14/09/2021	16:30:00	3.1	4.8	31	5	-47
14/09/2021	16:40:00	2.9	4.8	31	1	-48
14/09/2021	16:50:00	2.8	4.6	31	347	-48
14/09/2021	17:00:00	2.9	4.9	31	350	-47
14/09/2021	17:10:00	2.7	4.8	30	343	-47
14/09/2021	17:20:00	2.4	4.7	30	327	-46
14/09/2021	17:30:00	2.4	3.7	30	337	-46
14/09/2021	17:40:00	2.3	3.5	29	327	-46
14/09/2021	17:50:00	2.3	3.4	29	307	-46
14/09/2021	18:00:00	2.2	3.7	29	304	-43
14/09/2021	18:10:00	2.6	4	29	296	-43
14/09/2021	18:20:00	2.8	4.5	28	295	-43
14/09/2021	18:30:00	2.6	4.4	28	280	-43
14/09/2021	18:40:00	2.7	4.1	27	277	-43
14/09/2021	18:50:00	2.2	4.4	27	277	-43

Appendix C

Laboratory Documentation



ALS Laboratory: ES Sydney

EMAIL INVOICES TO: liam.spurr@ghd.com, fss@ghd.com

Biohazard info:

09-09-21 6:30am

/ ES2020GHDSE0002

Other comments:

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Ground Waters WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	MW03		07/09/2021 12:40 PM	Water	ALS: 4 Non ALS: 0	No	X		
002	MW04		07/09/2021 11:57 AM	Water	ALS: 4 Non ALS: 0	No	X		Broken well. Couldn't use dipper
003	MW05		07/09/2021 11:27 AM	Water	ALS: 4 Non ALS: 0	No	X		
004	MW06		07/09/2021 01:19 PM	Water	ALS: 4 Non ALS: 0	No	X		
005	MW07		07/09/2021 10:36 AM	Water	ALS: 4 Non ALS: 0	No	X		
006	QC108	Field duplicate	07/09/2021 11:58 AM	Water	ALS: 4 Non ALS: 0	No	X		
007	QC208	Interlab duplicate - please FWD to Eurofins for analysis	07/09/2021 12:00 PM	Water	ALS: 4 Non ALS: 0	No	X	TRH/BTEXN/8 metals (field filtered)	

Attach By PO : Internal Sheet: _____

Work Order Reference
ES2132702



Telephone : + 61-2-8784 8555



ALS Laboratory: ES Sydney

EMAIL INVOICES TO: liam.spurr@ghd.com, fss@ghd.com

DATE TIME:

Biohazard info:

C

Other comments:

/ ES2020GHD SER0002

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	MW03	Amber VOC Vial - Sulfuric Acid	40 mL	00160121018460	Purple	No	
001	MW03	Amber VOC Vial - Sulfuric Acid	40 mL	00160121018594	Purple	No	
001	MW03	Clear Plastic Bottle - Filtered; Lab-acidified	60 mL	00282002051919	Red/Green	Yes	
001	MW03	Amber Glass Bottle - Unpreserved	100 mL	00400321073853	Orange	No	
002	MW04	Clear Plastic Bottle - Filtered; Lab-acidified	60 mL	00282002052152	Red/Green	Yes	
002	MW04	Amber VOC Vial - Sulfuric Acid	40 mL	00160121018753	Purple	No	
002	MW04	Amber VOC Vial - Sulfuric Acid	40 mL	00160121018639	Purple	No	
002	MW04	Amber Glass Bottle - Unpreserved	100 mL	00400321073839	Orange	No	
003	MW05	Clear Plastic Bottle - Filtered; Lab-acidified	60 mL	00282002051908	Red/Green	Yes	
003	MW05	Amber VOC Vial - Sulfuric Acid	40 mL	00160121018500	Purple	No	
003	MW05	Amber VOC Vial - Sulfuric Acid	40 mL	00160121018173	Purple	No	
003	MW05	Amber Glass Bottle - Unpreserved	100 mL	00400321073883	Orange	No	
004	MW06	Amber VOC Vial - Sulfuric Acid	40 mL	00160121018566	Purple	No	
004	MW06	Amber VOC Vial - Sulfuric Acid	40 mL	00160121018509	Purple	No	
004	MW06	Amber Glass Bottle - Unpreserved	100 mL	00400321073878	Orange	No	
004	MW06	Clear Plastic Bottle - Filtered; Lab-acidified	60 mL	00282002052028	Red/Green	Yes	
005	MW07	Clear Plastic Bottle - Filtered; Lab-acidified	60 mL	00282002052652	Red/Green	Yes	
005	MW07	Amber VOC Vial - Sulfuric Acid	40 mL	00160121018388	Purple	No	
005	MW07	Amber Glass Bottle - Unpreserved	100 mL	00400321073841	Orange	No	
005	MW07	Amber VOC Vial - Sulfuric Acid	40 mL	00160121018423	Purple	No	
006	QC108	Amber Glass Bottle - Unpreserved	100 mL	00400321073845	Orange	No	
006	QC108	Amber VOC Vial - Sulfuric Acid	40 mL	00160121018498	Purple	No	
006	QC108	Amber VOC Vial - Sulfuric Acid	40 mL	00160121018523	Purple	No	
006	QC108	Clear Plastic Bottle - Filtered; Lab-acidified	60 mL	00282002051940	Red/Green	Yes	
007	QC208	Clear Plastic Bottle - Filtered; Lab-acidified	60 mL	00282002052574	Red/Green	Yes	
007	QC208	Amber VOC Vial - Sulfuric Acid	40 mL	00160121018542	Purple	No	

 CHAIN OF CUSTODY COC#: 26978 ALS Laboratory: ES Sydney		RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
CLIENT: GHDSER - GHD PTY LTD PROJECT: Darwin Turf Club EPL Monitoring SITE: Darwin Turf Club GME 8 ORDER NO: 12526136 PROJECT MANAGER: Liam Spurr PRIMARY SAMPLER: Liam Spurr EMAIL REPORTS TO: liam.spurr@ghd.com, ghdlabreports@ghd.com EMAIL INVOICES TO: liam.spurr@ghd.com, fss@ghd.com		DATE TIME: TURNAROUND REQUIREMENTS : 5 Days Biohazard info:	DATE TIME: 09.09.21 6:30am	DATE TIME:	DATE TIME:
CONTACT PH: 0408 767 607 SAMPLER MOBILE: 0408 767 QUOTE NO: SY/010/20 / ES2020GHDSER0002			LABORATORY USE ONLY (Circle) Custody Seal intact? Yes No N/A Free ice / frozen ice bricks present upon receipt? Yes No N/A Random Sample Temperature on Receipt: °C Other comments:		
007	QC208	Amber Glass Bottle - Unpreserved	100 mL	00400321073857	Orange No
007	QC208	Amber VOC Vial - Sulfuric Acid	40 mL	00160121018760	Purple No
Total Bottle Count: ALS: 28, Non ALS: 0					

Kim Phan

From: Christopher Redford
Sent: Thursday, 9 September 2021 11:07 AM
To: Kim Phan
Cc: Helen Simpson
Subject: FW: [EXTERNAL] - RE: Compass COC#26978 - Darwin Turf Club EPL Monitoring
Attachments: approved-8c15969a-aa98-4543-9f80-96158d113741 (1).pdf

Hi Kimmy, COC attached

AlsCompass_26978.xml

Complete

9/09/2021 11:02:06 AM

Angle Automated System ES2132702

Best regards,

Christopher Redford

Project Manager, Environmental NSW

Please note that I am working remotely and can be contacted directly on (02) 8784 8529.



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christopher.redford@alsglobal.com
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Smithfield NSW 2164 AUSTRALIA

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EnviroMail™ 131 – Important Changes to the Australian Standard Leaching Procedures AS4439.2 & AS4439.3

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From: Liam Spurr [mailto:Liam.Spurr@ghd.com]
Sent: Thursday, 9 September 2021 10:53 AM
To: Christopher Redford <christopher.redford@ALSGlobal.com>
Subject: [EXTERNAL] - RE: Compass COC#26978 - Darwin Turf Club EPL Monitoring

CAUTION: This email originated from outside of ALS. Do not click links or open attachments unless you recognize the sender and are sure content is relevant to you.

Done, thanks for the reminder!

Liam Spurr
MSc, BSc
Hydrogeologist | NT HSE Committee Chair

GHD
Proudly employee-owned | ghd.com
Level 7, 24 Mitchell Street, Darwin NT 0800 Australia
M +61 408 767 607 E liam.spurr@ghd.com

Sent from my Galaxy

----- Original message -----

From: Christopher Redford <christopher.redford@ALSGlobal.com>
Date: 9/9/21 10:18 (GMT+09:30)
To: Liam Spurr <liam.spurr@ghd.com>
Subject: Compass COC#26978 - Darwin Turf Club EPL Monitoring

Hi Liam,

Are you able to 'Approve' this COC when you get the chance?

These samples are in Sydney and we cannot scan them through until it is approved.

Cheers,

Best regards,

Christopher Redford

Project Manager, Environmental NSW

Please note that I am working remotely and can be contacted directly on (02) 8784 8529.



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CERTIFICATE OF ANALYSIS

Work Order : **ES2132702**
Client : **GHD PTY LTD**
Contact : **MR LIAM SPURR**
Address : **Level 7 24 Mitchell Street**
DARWIN NT, AUSTRALIA 0800
Telephone : **----**
Project : **Darwin Turf Club EPL Monitoring**
Order number : **12526136**
C-O-C number : **26978**
Sampler : **LIAM SPURR, Vasillea Milsom**
Site : **Darwin Turf Club GME 8**
Quote number : **SY/010/20**
No. of samples received : **6**
No. of samples analysed : **6**

Page : 1 of 7
Laboratory : Environmental Division Sydney
Contact : Sarah Mathew
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-2-8784 8555
Date Samples Received : 09-Sep-2021 06:30
Date Analysis Commenced : 09-Sep-2021
Issue Date : 16-Sep-2021 17:06



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>
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW



General Comments

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

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

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

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

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

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

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				MW03	MW04	MW05	MW06	MW07
Sampling date / time				07-Sep-2021 12:10	07-Sep-2021 11:27	07-Sep-2021 10:57	07-Sep-2021 12:49	07-Sep-2021 10:06
Compound	CAS Number	LOR	Unit	ES2132702-001	ES2132702-002	ES2132702-003	ES2132702-004	ES2132702-005
				Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.001	0.004	<0.001	0.001	0.003
Cadmium	7440-43-9	0.0001	mg/L	0.0002	0.0006	<0.0001	<0.0001	0.0003
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	0.142	0.004	0.058	0.003	0.144
Nickel	7440-02-0	0.001	mg/L	0.021	0.133	0.009	0.001	0.024
Lead	7439-92-1	0.001	mg/L	0.008	<0.001	0.004	<0.001	0.012
Zinc	7440-66-6	0.005	mg/L	0.204	0.461	0.099	0.018	0.208
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				MW03	MW04	MW05	MW06	MW07
Sampling date / time				07-Sep-2021 12:10	07-Sep-2021 11:27	07-Sep-2021 10:57	07-Sep-2021 12:49	07-Sep-2021 10:06
Compound	CAS Number	LOR	Unit	ES2132702-001	ES2132702-002	ES2132702-003	ES2132702-004	ES2132702-005
				Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	100	102	92.2	82.1	103
Toluene-D8	2037-26-5	2	%	114	116	102	92.3	116
4-Bromofluorobenzene	460-00-4	2	%	119	120	99.6	97.0	125



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				QC108 Field duplicate	----	----	----	----
Sampling date / time				07-Sep-2021 11:28	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2132702-006	-----	-----	-----	-----
Result				----	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	0.004	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	0.0005	----	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L	<0.001	----	----	----	----
Nickel	7440-02-0	0.001	mg/L	0.127	----	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L	0.453	----	----	----	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<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								
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	----	----	----	----



Analytical Results

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

Sample ID

				QC108	----	----	----	----
				Field duplicate				
Sampling date / time				07-Sep-2021 11:28	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2132702-006	-----	-----	-----	-----
				Result	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	102	----	----	----	----
Toluene-D8	2037-26-5	2	%	118	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	120	----	----	----	----



Surrogate Control Limits

Sub-Matrix: GROUNDWATER

		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

QUALITY CONTROL REPORT

Work Order	: ES2132702	Page	: 1 of 5
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR LIAM SPURR	Contact	: Sarah Mathew
Address	: Level 7 24 Mitchell Street DARWIN NT, AUSTRALIA 0800	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: Darwin Turf Club EPL Monitoring	Date Samples Received	: 09-Sep-2021
Order number	: 12526136	Date Analysis Commenced	: 09-Sep-2021
C-O-C number	: 26978	Issue Date	: 16-Sep-2021
Sampler	: LIAM SPURR, Vasillea Milsom		
Site	: Darwin Turf Club GME 8		
Quote number	: SY/010/20		
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>
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW



General Comments

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

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

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

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**

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: 3897580)									
ES2132702-001	MW03	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	0.0002	0.0002	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	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: Copper	7440-50-8	0.001	mg/L	0.142	0.144	1.4	0% - 20%
		EG020A-F: Lead	7439-92-1	0.001	mg/L	0.008	0.008	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.021	0.020	0.0	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.204	0.207	1.6	0% - 20%
ES2132729-001	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	0.006	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: 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: Nickel	7440-02-0	0.001	mg/L	0.014	0.014	0.0	0% - 50%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.009	0.009	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 3897579)									
ES2132698-002	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2132702-006	QC108 Field duplicate	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3896461)									
CA2105517-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES2132702-001	MW03	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3896461)									
CA2105517-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES2132702-001	MW03	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit

Page : 3 of 5
 Work Order : ES2132702
 Client : GHD PTY LTD
 Project : Darwin Turf Club EPL Monitoring



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: 3896461)									
CA2105517-001	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	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
ES2132702-001	MW03	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			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EG020F: Dissolved Metals by ICP-MS (QCLot: 3897580)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	90.3	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	87.0	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	85.2	85.0	111
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	88.6	83.0	111
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	88.1	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	89.5	81.0	117
EG035F: Dissolved Mercury by FIMS (QCLot: 3897579)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	102	83.0	105
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3893512)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	88.7	55.8	112
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	79.1	71.6	113
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	79.1	56.0	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3896461)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	106	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3893512)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	83.7	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	83.2	61.5	121
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3896461)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	106	75.0	127
EP080: BTEXN (QCLot: 3896461)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	104	70.0	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	111	69.0	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	111	70.0	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	114	69.0	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	113	72.0	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	120	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: 3897580)							
ES2132702-002	MW04	EG020A-F: Arsenic	7440-38-2	1 mg/L	104	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	93.1	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	89.6	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	89.3	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	90.6	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	95.7	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	97.5	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 3897579)							
ES2132698-001	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	85.4	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3896461)							
CA2105517-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	74.5	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3896461)							
CA2105517-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	76.7	70.0	130
EP080: BTEXN (QCLot: 3896461)							
CA2105517-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	80.2	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	81.2	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	79.3	70.0	130
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	77.6	70.0	130
			106-42-3				
		EP080: ortho-Xylene	95-47-6	25 µg/L	77.3	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	76.2	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES2132702	Page	: 1 of 5
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR LIAM SPURR	Telephone	: +61-2-8784 8555
Project	: Darwin Turf Club EPL Monitoring	Date Samples Received	: 09-Sep-2021
Site	: Darwin Turf Club GME 8	Issue Date	: 16-Sep-2021
Sampler	: LIAM SPURR, Vasillea Milsom	No. of samples received	: 6
Order number	: 12526136	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

- 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)						
TRH - Semivolatle Fraction		0	8	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)						
TRH - Semivolatle Fraction		0	8	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 Plastic Bottle - Filtered; Lab-acidified (EG020A-F) MW03, MW05, MW07, MW04, MW06, QC108 - Field duplicate	07-Sep-2021	----	----	----	13-Sep-2021	06-Mar-2022	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Filtered; Lab-acidified (EG035F) MW03, MW05, MW07, MW04, MW06, QC108 - Field duplicate	07-Sep-2021	----	----	----	13-Sep-2021	05-Oct-2021	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071) MW03, MW05, MW07, MW04, MW06, QC108 - Field duplicate	07-Sep-2021	09-Sep-2021	14-Sep-2021	✓	14-Sep-2021	19-Oct-2021	✓
Amber VOC Vial - Sulfuric Acid (EP080) MW03, MW05, MW07, MW04, MW06, QC108 - Field duplicate	07-Sep-2021	14-Sep-2021	21-Sep-2021	✓	14-Sep-2021	21-Sep-2021	✓



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)		07-Sep-2021	09-Sep-2021	14-Sep-2021	✔	14-Sep-2021	19-Oct-2021	✔
MW03,	MW04,							
MW05,	MW06,							
MW07,	QC108 - Field duplicate							
Amber VOC Vial - Sulfuric Acid (EP080)		07-Sep-2021	14-Sep-2021	21-Sep-2021	✔	14-Sep-2021	21-Sep-2021	✔
MW03,	MW04,							
MW05,	MW06,							
MW07,	QC108 - Field duplicate							
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)		07-Sep-2021	14-Sep-2021	21-Sep-2021	✔	14-Sep-2021	21-Sep-2021	✔
MW03,	MW04,							
MW05,	MW06,							
MW07,	QC108 - Field duplicate							



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	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	17	11.76	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	8	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	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	17	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	8	12.50	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	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	17	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	8	12.50	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	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	17	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	8	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.

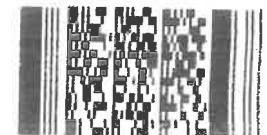
Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected 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).
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.

CHAIN OF CUSTODY ALS COC#: 26978 ALS Laboratory: ES Sydney		RELINQUISHED BY:	RECEIVED BY: <i>Kim</i>	RELINQUISHED BY:	RECEIVED BY: <i>824087</i> <i>PPHillips</i>
		DATE TIME:	DATE TIME: <i>09.09.21 6.30am</i>	DATE TIME:	DATE TIME: <i>9/9/21 5.55pm</i>
CLIENT: GHDSER - GHD PTY LTD PROJECT: Darwin Turf Club EPL Monitoring SITE: Darwin Turf Club GME 8 ORDER NO: 12526136 PROJECT MANAGER: Liam Spurr PRIMARY SAMPLER: Liam Spurr EMAIL REPORTS TO: liam.spurr@ghd.com , ghdlabreports@ghd.com EMAIL INVOICES TO: liam.spurr@ghd.com , fss@ghd.com		TURNAROUND REQUIREMENTS : 5 Days Biohazard info:		LABORATORY USE ONLY (Circle) Custody Seal intact? Yes No N/A Free ice / frozen ice bricks present upon receipt? Yes No N/A Random Sample Temperature on Receipt: °C Other comments:	
		CONTACT PH: 0408 767 607 SAMPLER MOBILE: 0408 767 QUOTE NO: SY/010/20 / ES2020GHDSER0002			

SAMPLE DETAILS							ANALYSIS REQUIRED		
SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Ground Waters WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	MW03		07/09/2021 12:40 PM	Water	ALS: 4 Non ALS: 0	No	X		
002	MW04		07/09/2021 11:57 AM	Water	ALS: 4 Non ALS: 0	No	X		Broken well. Couldn't use dipper
003	MW05		07/09/2021 11:27 AM	Water	ALS: 4 Non ALS: 0	No	X		
004	MW06		07/09/2021 01:19 PM	Water	ALS: 4 Non ALS: 0	No	X		
005	MW07		07/09/2021 10:36 AM	Water	ALS: 4 Non ALS: 0	No	X		
006	QC108	Field duplicate	07/09/2021 11:58 AM	Water	ALS: 4 Non ALS: 0	No	X		
007	QC208	Interlab duplicate - please FWD to Eurofins for analysis	07/09/2021 12:00 PM	Water	ALS: 4 Non ALS: 0	No	X	TRH/BTEXN/8 metals (field filtered)	

Subcon Forward Lab Split WO
 Lab / Analysis: _____
 Organised By / Date: *Eurofins*
 Relinquished By / Date: *QC208*
 Courier: _____
 WO No: *ES2132702*
 Attach by PO Internal Sheet: _____

Environmental Division
 Sydney
 Work Order Reference
ES2132702



Telephone : - 61-2-8784 8555



ALS Laboratory: ES Sydney

RECEIVED BY:

RECEIVED BY:

DATE TIME:

RP willip ✓
DATE TIME: 9/9/21 5:55 pm

EMAIL INVOICES TO: liam.spurr@ghd.com, fss@ghd.com

/ ES2020GHD SER0002

Other comments:

Thursday, September 9, 2021 12:53:28 AM



CHAIN OF CUSTODY

ALS

COC#: 26978

ALS Laboratory: ES Sydney

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: GHDSER - GHD PTY LTD

PROJECT: Darwin Turf Club EPL Monitoring

SITE: Darwin Turf Club GME 8

ORDER NO: 12526136

PROJECT MANAGER: Liam Spurr

PRIMARY SAMPLER: Liam Spurr

EMAIL REPORTS TO: liam.spurr@ghd.com, ghdlabreports@ghd.com

EMAIL INVOICES TO: liam.spurr@ghd.com, fss@ghd.com

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH: 0408 767 607

SAMPLER MOBILE: 0408 767

QUOTE NO: SY/010/20

/ ES2020GHDSER0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

007

QC208

Amber Glass Bottle - Unpreserved

100 mL

00400321073857

Orange

No

007

QC208

Amber VOC Vial - Sulfuric Acid

40 mL

00160121018760

Purple

No

Total Bottle Count: ALS: 28, Non ALS: 0

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 Unit F3, Building F 16 Mars Road Lane Cove West NSW 2066 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'Rorke 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:	GHD Pty Ltd NT
Contact name:	Liam Spurr
Project name:	DARWIN TURF CLUB EPL MONITORING
Project ID:	Not provided
Turnaround time:	5 Day
Date/Time received	Sep 9, 2021 5:55 PM
Eurofins reference	824087

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

Samples received by the laboratory after 5.30pm are deemed to have been received the following working day.

Contact

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

Harry Bacalis on phone : or by email: HarryBacalis@eurofins.com

Results will be delivered electronically via email to Liam Spurr - liam.spurr@ghd.com.

Note: A copy of these results will also be delivered to the general GHD Pty Ltd NT email address.

Company Name:	GHD Pty Ltd NT	Order No.:		Received:	Sep 9, 2021 5:55 PM
Address:	Level 7, 24 Mitchell Street Darwin NT 0800	Report #:	824087	Due:	Sep 16, 2021
		Phone:	08 8982 0100	Priority:	5 Day
		Fax:	08 8981 1075	Contact Name:	Liam Spurr
Project Name:	DARWIN TURF CLUB EPL MONITORING				
Eurofins Analytical Services Manager : Harry Bacalis					

Sample Detail						Eurofins Suite B6 (filtered metals)
Melbourne Laboratory - NATA # 1261 Site # 1254						
Sydney Laboratory - NATA # 1261 Site # 18217						X
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	QC208	Sep 07, 2021	12:00PM	Water	S21-Se25084	X
Test Counts						1

GHD Pty Ltd NT
Level 7, 24 Mitchell Street
Darwin
NT 0800



NATA Accredited
Accreditation Number 1261
Site Number 18217

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: **Liam Spurr**

Report **824087-W**
Project name **DARWIN TURF CLUB EPL MONITORING**
Received Date **Sep 09, 2021**

Client Sample ID			QC208
Sample Matrix			Water
Eurofins Sample No.			S21-Se25084
Date Sampled			Sep 07, 2021
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons			
TRH C6-C9	0.02	mg/L	< 0.02
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	< 0.01
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	< 0.05
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	< 0.001
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	%	133
Heavy Metals			
Arsenic (filtered)	0.001	mg/L	< 0.005
Cadmium (filtered)	0.0002	mg/L	< 0.001
Chromium (filtered)	0.001	mg/L	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001
Lead (filtered)	0.001	mg/L	< 0.005
Mercury (filtered)	0.0001	mg/L	< 0.0005
Nickel (filtered)	0.001	mg/L	0.12
Zinc (filtered)	0.005	mg/L	0.42

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 B6 (filtered metals)			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Sep 14, 2021	7 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Sep 13, 2021	7 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Sep 14, 2021	7 Days
BTEX - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Sep 13, 2021	14 Days
Metals M8 filtered - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Sep 13, 2021	28 Days

Company Name: GHD Pty Ltd NT
Address: Level 7, 24 Mitchell Street
Darwin
NT 0800
Project Name: DARWIN TURF CLUB EPL MONITORING

Order No.:
Report #: 824087
Phone: 08 8982 0100
Fax: 08 8981 1075

Received: Sep 9, 2021 5:55 PM
Due: Sep 16, 2021
Priority: 5 Day
Contact Name: Liam Spurr

Eurofins Analytical Services Manager : Harry Bacalis

Sample Detail						Eurofins Suite B6 (filtered metals)
Melbourne Laboratory - NATA # 1261 Site # 1254						
Sydney Laboratory - NATA # 1261 Site # 18217						X
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	QC208	Sep 07, 2021	12:00PM	Water	S21-Se25084	X
Test Counts						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.

****NOTE:** pH duplicates are reported as a range NOT as RPD

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 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NC	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

QC - Acceptance Criteria

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%

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 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

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. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. 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.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " - " in the report means that the specific analyte was not added to the QC sample.
10. 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							
Heavy Metals							
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Cadmium (filtered)	mg/L	< 0.0002			0.0002	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons							
TRH C6-C9	%	124			70-130	Pass	
TRH C10-C14	%	114			70-130	Pass	
Naphthalene	%	113			70-130	Pass	
TRH C6-C10	%	125			70-130	Pass	
TRH >C10-C16	%	110			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	108			70-130	Pass	
Toluene	%	112			70-130	Pass	
Ethylbenzene	%	114			70-130	Pass	
m&p-Xylenes	%	125			70-130	Pass	
o-Xylene	%	110			70-130	Pass	
Xylenes - Total*	%	120			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic (filtered)	%	97			80-120	Pass	
Cadmium (filtered)	%	103			80-120	Pass	
Chromium (filtered)	%	102			80-120	Pass	
Copper (filtered)	%	104			80-120	Pass	
Lead (filtered)	%	103			80-120	Pass	
Mercury (filtered)	%	93			80-120	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Nickel (filtered)			%	104			80-120	Pass	
Zinc (filtered)			%	100			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	N21-Se16664	NCP	%	113			70-130	Pass	
TRH >C10-C16	N21-Se16664	NCP	%	104			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic (filtered)	S21-Se24763	NCP	%	106			75-125	Pass	
Cadmium (filtered)	S21-Se24763	NCP	%	100			75-125	Pass	
Chromium (filtered)	S21-Se24763	NCP	%	91			75-125	Pass	
Copper (filtered)	S21-Se24763	NCP	%	89			75-125	Pass	
Lead (filtered)	S21-Se24763	NCP	%	88			75-125	Pass	
Mercury (filtered)	S21-Se19802	NCP	%	83			75-125	Pass	
Nickel (filtered)	S21-Se24763	NCP	%	88			75-125	Pass	
Zinc (filtered)	S21-Se24427	NCP	%	87			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 C6-C9	N21-Se16658	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C10-C14	N21-Se16663	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	N21-Se16663	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	N21-Se16663	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Naphthalene	N21-Se16658	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
TRH C6-C10	N21-Se16658	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH >C10-C16	N21-Se16663	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH >C16-C34	N21-Se16663	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C34-C40	N21-Se16663	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	N21-Se16658	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Toluene	N21-Se16658	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Ethylbenzene	N21-Se16658	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
m&p-Xylenes	N21-Se16658	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
o-Xylene	N21-Se16658	NCP	mg/L	0.001	0.001	9.0	30%	Pass	
Xylenes - Total*	N21-Se16658	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic (filtered)	S21-Se24761	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cadmium (filtered)	S21-Se24761	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium (filtered)	S21-Se24811	NCP	mg/L	0.001	0.001	6.0	30%	Pass	
Copper (filtered)	S21-Se24811	NCP	mg/L	0.12	0.13	9.0	30%	Pass	
Lead (filtered)	S21-Se24761	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury (filtered)	S21-Se24761	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel (filtered)	S21-Se24811	NCP	mg/L	0.71	0.77	9.0	30%	Pass	
Zinc (filtered)	S21-Se24811	NCP	mg/L	0.24	0.26	7.0	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.

Authorised by:

Emily Daos	Analytical Services Manager
Andrew Sullivan	Senior Analyst-Organic (NSW)
John Nguyen	Senior Analyst-Metal (NSW)
Roopesh Rangarajan	Senior Analyst-Volatile (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](#).

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

CHAIN OF CUSTODY COC#: 27659 ALS Laboratory: ES Sydney		RELINQUISHED BY:	RECEIVED BY: <i>Sgt J. No</i>	RELINQUISHED BY:	RECEIVED BY:
		DATE TIME:	DATE TIME: <i>17/09/21 1500</i>	DATE TIME:	DATE TIME:
CLIENT: GHDSER - GHD PTY LTD PROJECT: Darwin Turf Club EPL Monitoring SITE: DTC GME 9 ORDER NO: 12526136 PROJECT MANAGER: Liam Spurr PRIMARY SAMPLER: Charlotte George EMAIL REPORTS TO: liam.spurr@ghd.com , ghdlabreports@ghd.com EMAIL INVOICES TO: liam.spurr@ghd.com , fss@ghd.com		TURNAROUND REQUIREMENTS : 5 Days Biohazard info:		LABORATORY USE ONLY (Circle) Custody Seal intact? ☒ Yes No N/A ☒ Free ice / frozen ice bricks present upon receipt? Yes No N/A Random Sample Temperature on Receipt: <i>9.8</i> °C Other comments:	
		CONTACT PH: 0408 767 607 SAMPLER MOBILE: QUOTE NO: SY/010/20 / ES2020GHDSER0002			

SAMPLE DETAILS							ANALYSIS REQUIRED		
SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Ground Waters WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	MW03		15/09/2021 01:29 PM	Water	ALS: 4 Non ALS: 0	No	X		
002	MW04		15/09/2021 01:32 PM	Water	ALS: 4 Non ALS: 0	No	X		
003	MW05		15/09/2021 01:30 PM	Water	ALS: 4 Non ALS: 0	No	X		
004	MW06		15/09/2021 01:32 PM	Water	ALS: 4 Non ALS: 0	No	X		
005	MW07		15/09/2021 01:28 PM	Water	ALS: 4 Non ALS: 0	No	X		

Environmental Division
 Sydney
 Work Order Reference
ES2133855

Telephone : +61-2-6784 856f

**CHAIN OF CUSTODY**

COC#: 27659

ALS Laboratory: ES Sydney

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

CLIENT: GHDSER - GHD PTY LTD

PROJECT: Darwin Turf Club EPL Monitoring

SITE: DTC GME 9

ORDER NO: 12526136

PROJECT MANAGER: Liam Spurr

PRIMARY SAMPLER: Charlotte George

EMAIL REPORTS TO: liam.spurr@ghd.com, ghdlabreports@ghd.com

EMAIL INVOICES TO: liam.spurr@ghd.com, fss@ghd.com

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH: 0408 767 607

SAMPLER MOBILE:

QUOTE NO: SY/010/20

/ ES2020GHDSER0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

☒ Yes

No

N/A

☒ Free ice / frozen ice bricks present upon receipt?☒ Yes

No

N/A

Random Sample Temperature on Receipt:

9.8 °C

Other comments:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	MW03	Amber Glass Bottle - Unpreserved	100 mL	00400321073866	Orange	No	
001	MW03	Amber VOC Vial - Sulfuric Acid	40 mL	00160121018504	Purple	No	
001	MW03	Amber VOC Vial - Sulfuric Acid	40 mL	00160121018465	Purple	No	
001	MW03	Clear Plastic Bottle - Filtered; Lab-acidified	60 mL	00282002051959	Red/Green	Yes	
002	MW04	Clear Plastic Bottle - Filtered; Lab-acidified	60 mL	00282002051927	Red/Green	Yes	
002	MW04	Amber VOC Vial - Sulfuric Acid	40 mL	00160121018527	Purple	No	
002	MW04	Amber Glass Bottle - Unpreserved	100 mL	00400321073868	Orange	No	
002	MW04	Amber VOC Vial - Sulfuric Acid	40 mL	00160121018484	Purple	No	
003	MW05	Amber VOC Vial - Sulfuric Acid	40 mL	00160121018608	Purple	No	
003	MW05	Amber VOC Vial - Sulfuric Acid	40 mL	00160121018418	Purple	No	
003	MW05	Amber Glass Bottle - Unpreserved	100 mL	00400321073789	Orange	No	
003	MW05	Clear Plastic Bottle - Filtered; Lab-acidified	60 mL	00282002052247	Red/Green	Yes	
004	MW06	Amber Glass Bottle - Unpreserved	100 mL	00400321073745	Orange	No	
004	MW06	Amber VOC Vial - Sulfuric Acid	40 mL	00160121018832	Purple	No	
004	MW06	Amber VOC Vial - Sulfuric Acid	40 mL	00160121018046	Purple	No	
004	MW06	Clear Plastic Bottle - Filtered; Lab-acidified	60 mL	00282002052121	Red/Green	Yes	
005	MW07	Amber VOC Vial - Sulfuric Acid	40 mL	00161020062398	Purple	No	
005	MW07	Amber VOC Vial - Sulfuric Acid	40 mL	00161020062528	Purple	No	
005	MW07	Amber Glass Bottle - Unpreserved	100 mL	00400321074060	Orange	No	
005	MW07	Clear Plastic Bottle - Filtered; Lab-acidified	60 mL	00280019004005	Red/Green	Yes	

Total Bottle Count: ALS: 20, Non ALS: 0

CERTIFICATE OF ANALYSIS

Work Order : **ES2133855**
Client : **GHD PTY LTD**
Contact : **MR LIAM SPURR**
Address : **LEVEL 15, 133 CASTLEREAGH STREET**
SYDNEY NSW, AUSTRALIA 2000
Telephone : **----**
Project : **Darwin Turf Club EPL Monitoring**
Order number : **12526136**
C-O-C number : **27659**
Sampler : **Charlotte George, LIAM SPURR**
Site : **DTC GME 9**
Quote number : **SY/010/20**
No. of samples received : **5**
No. of samples analysed : **5**

Page : 1 of 5
Laboratory : Environmental Division Sydney
Contact : Sarah Mathew
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-2-8784 8555
Date Samples Received : 17-Sep-2021 15:00
Date Analysis Commenced : 20-Sep-2021
Issue Date : 23-Sep-2021 16:31



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

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



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.



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				MW03	MW04	MW05	MW06	MW07
Sampling date / time				15-Sep-2021 13:29	15-Sep-2021 13:32	15-Sep-2021 13:30	15-Sep-2021 13:32	15-Sep-2021 13:28
Compound	CAS Number	LOR	Unit	ES2133855-001	ES2133855-002	ES2133855-003	ES2133855-004	ES2133855-005
				Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.001	0.004	<0.001	0.003	0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.0005	<0.0001	<0.0001	0.0002
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	0.002	0.002	0.002	0.001	0.004
Nickel	7440-02-0	0.001	mg/L	0.001	0.129	<0.001	0.001	0.004
Lead	7439-92-1	0.001	mg/L	<0.001	0.002	<0.001	<0.001	0.006
Zinc	7440-66-6	0.005	mg/L	0.015	0.450	0.019	0.015	0.022
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				MW03	MW04	MW05	MW06	MW07
Sampling date / time				15-Sep-2021 13:29	15-Sep-2021 13:32	15-Sep-2021 13:30	15-Sep-2021 13:32	15-Sep-2021 13:28
Compound	CAS Number	LOR	Unit	ES2133855-001	ES2133855-002	ES2133855-003	ES2133855-004	ES2133855-005
				Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	85.0	132	118	117	112
Toluene-D8	2037-26-5	2	%	88.3	112	106	103	101
4-Bromofluorobenzene	460-00-4	2	%	91.6	112	102	102	99.0



Surrogate Control Limits

Sub-Matrix: GROUNDWATER		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

QUALITY CONTROL REPORT

Work Order	: ES2133855	Page	: 1 of 5
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR LIAM SPURR	Contact	: Sarah Mathew
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: Darwin Turf Club EPL Monitoring	Date Samples Received	: 17-Sep-2021
Order number	: 12526136	Date Analysis Commenced	: 20-Sep-2021
C-O-C number	: 27659	Issue Date	: 23-Sep-2021
Sampler	: Charlotte George, LIAM SPURR		
Site	: DTC GME 9		
Quote number	: SY/010/20		
No. of samples received	: 5		
No. of samples analysed	: 5		



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



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**

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: 3912684)									
ES2133787-001	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: Chromium	7440-47-3	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: 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	<0.005	<0.005	0.0	No Limit
WN2110674-003	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: Chromium	7440-47-3	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: 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	<0.005	<0.005	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 3912682)									
ES2133448-025	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2133617-006	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: 3911352)									
ES2133855-001	MW03	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES2133896-004	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	21300	18600	13.8	0% - 20%
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3911352)									
ES2133855-001	MW03	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES2133896-004	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	22600	19700	13.7	0% - 20%

Page : 3 of 5
 Work Order : ES2133855
 Client : GHD PTY LTD
 Project : Darwin Turf Club EPL Monitoring



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: 3911352)									
ES2133855-001	MW03	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
ES2133896-004	Anonymous	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
		EP080: Benzene	71-43-2	1	µg/L	2500	2200	12.8	0% - 20%
		EP080: Toluene	108-88-3	2	µg/L	8090	7610	6.1	0% - 20%
		EP080: Ethylbenzene	100-41-4	2	µg/L	310	274	12.2	0% - 50%
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	2740	2430	12.1	0% - 20%
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	524	470	10.9	0% - 20%
		EP080: Naphthalene	91-20-3	5	µg/L	55	49	11.7	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 (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 3912684)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	89.8	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	89.8	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	87.2	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	87.1	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	89.5	83.0	111
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	90.0	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	90.9	81.0	117
EG035F: Dissolved Mercury by FIMS (QCLot: 3912682)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	101	83.0	105
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3910489)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	81.5	55.8	112
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	86.1	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: 3911352)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	78.8	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3910489)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	68.3	57.9	119
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	85.8	62.5	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	64.3	61.5	121
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3911352)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	81.4	75.0	127
EP080: BTEXN (QCLot: 3911352)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	94.9	70.0	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	102	69.0	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	96.5	70.0	120
EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	10 µg/L	99.4	69.0	121
	106-42-3							
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	103	72.0	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	75.3	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: 3912684)							
ES2133787-001	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	127	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	127	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	127	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	125	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	129	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	125	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	127	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 3912682)							
ES2133259-011	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	97.3	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3911352)							
ES2133855-001	MW03	EP080: C6 - C9 Fraction	----	325 µg/L	83.5	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3911352)							
ES2133855-001	MW03	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	83.0	70.0	130
EP080: BTEXN (QCLot: 3911352)							
ES2133855-001	MW03	EP080: Benzene	71-43-2	25 µg/L	85.4	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	91.2	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	84.9	70.0	130
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	93.7	70.0	130
			106-42-3				
		EP080: ortho-Xylene	95-47-6	25 µg/L	93.8	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	98.3	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES2133855	Page	: 1 of 5
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR LIAM SPURR	Telephone	: +61-2-8784 8555
Project	: Darwin Turf Club EPL Monitoring	Date Samples Received	: 17-Sep-2021
Site	: DTC GME 9	Issue Date	: 23-Sep-2021
Sampler	: Charlotte George, LIAM SPURR	No. of samples received	: 5
Order number	: 12526136	No. of samples analysed	: 5

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 Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
TRH - Semivolatile Fraction	0	16	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
TRH - Semivolatile Fraction	0	16	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 Plastic Bottle - Filtered; Lab-acidified (EG020A-F) MW03, MW05, MW07	MW04, MW06,	15-Sep-2021	----	----	----	21-Sep-2021	14-Mar-2022	✓
EG035F: Dissolved Mercury by FIMS								
Clear Plastic Bottle - Filtered; Lab-acidified (EG035F) MW03, MW05, MW07	MW04, MW06,	15-Sep-2021	----	----	----	21-Sep-2021	13-Oct-2021	✓
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071) MW03, MW05, MW07	MW04, MW06,	15-Sep-2021	20-Sep-2021	22-Sep-2021	✓	21-Sep-2021	30-Oct-2021	✓
Amber VOC Vial - Sulfuric Acid (EP080) MW03, MW05, MW07	MW04, MW06,	15-Sep-2021	21-Sep-2021	29-Sep-2021	✓	21-Sep-2021	29-Sep-2021	✓



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)		15-Sep-2021	20-Sep-2021	22-Sep-2021	✔	21-Sep-2021	30-Oct-2021	✔
MW03,	MW04,							
MW05,	MW06,							
MW07								
Amber VOC Vial - Sulfuric Acid (EP080)		15-Sep-2021	21-Sep-2021	29-Sep-2021	✔	21-Sep-2021	29-Sep-2021	✔
MW03,	MW04,							
MW05,	MW06,							
MW07								
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)		15-Sep-2021	21-Sep-2021	29-Sep-2021	✔	21-Sep-2021	29-Sep-2021	✔
MW03,	MW04,							
MW05,	MW06,							
MW07								



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	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	15	13.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	16	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	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	16	6.25	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	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	16	6.25	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	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	16	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).
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.

CHAIN OF CUSTODY RECORD

Hunting & Environment Today April 2006 235-52



Sydney Laboratory

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Brisbane Laboratory

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[illegible]

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Eurofins ARL Pty Ltd

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Eurofins Environment Testing NZ Limited

NZBN: 9429046024954

Sample Receipt Advice

Company name:	GHD Pty Ltd NT
Contact name:	Liam Spurr
Project name:	DTC EPL MONITORING
Project ID:	12526136
Turnaround time:	5 Day
Date/Time received	Sep 16, 2021 12:00 AM
Eurofins reference	825235

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:

Harry Bacalis on phone : or by email: HarryBacalis@eurofins.com

Results will be delivered electronically via email to Liam Spurr - liam.spurr@ghd.com.

Note: A copy of these results will also be delivered to the general GHD Pty Ltd NT email address.



Environment Testing

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Company Name: GHD Pty Ltd NT
Address: Level 7, 24 Mitchell Street
Darwin
NT 0800
Project Name: DTC EPL MONITORING
Project ID: 12526136

Order No.: 12526136
Report #: 825235
Phone: 08 8982 0100
Fax: 08 8981 1075

Received: Sep 16, 2021 12:00 AM
Due: Sep 23, 2021
Priority: 5 Day
Contact Name: Liam Spurr

Eurofins Analytical Services Manager : Harry Bacalis

Sample Detail						Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	BTEXN (TOL5)
Melbourne Laboratory - NATA # 1261 Site # 1254									
Sydney Laboratory - NATA # 1261 Site # 18217									
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X	X
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	AQM01	Sep 14, 2021	6:00PM	6L Summa Canister	T21-Se34317	X	X	X	X
2	AQM02	Sep 14, 2021	6:00PM	6L Summa Canister	T21-Se34318	X	X	X	X
3	AQM03	Sep 14, 2021	6:00PM	6L Summa Canister	T21-Se34319	X	X	X	X
Test Counts						3	3	3	3

GHD Pty Ltd NT
Level 7, 24 Mitchell Street
Darwin
NT 0800



NATA Accredited
Accreditation Number 1261
Site Number 20794

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: **Liam Spurr**

Report **825235-TO**
Project name **DTC EPL MONITORING**
Project ID **12526136**
Received Date **Sep 16, 2021**

Client Sample ID			AQM01	AQM02	AQM03
Sample Matrix			6L Summa Canister	6L Summa Canister	6L Summa Canister
Eurofins Sample No.			T21-Se34317	T21-Se34318	T21-Se34319
Date Sampled			Sep 14, 2021	Sep 14, 2021	Sep 14, 2021
Receipt Vac./Pressure (inHg)			8.0	7.4	7.1
Final Pressure (psi)			5.0	5.0	5.0
Test/Reference	LOR	Unit			
Dilution Factor	0.1		1.8	1.8	1.7
BTEXN (TO15)					
Benzene	1.6	ug/m3	< 3	< 3	< 3
Ethylbenzene	2.2	ug/m3	< 4	< 4	3.9
m.p-Xylene	4.4	ug/m3	< 8	< 8	< 8
o-Xylene	2.2	ug/m3	< 4	< 4	< 4
Toluene	7.5	ug/m3	< 7.5	< 7.5	< 7.5
Naphthalene	10.5	ug/m3	< 19	< 19	< 19
4-Bromofluorobenzene (surr.)	1	%	100	95	100

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

BTEXN (TO15)

Testing Site

BrisbaneAir

Extracted

Sep 17, 2021

Holding Time

30 Days

- Method: SOP #6 Analysis of Volatile Organic Compounds in Summa Polished Canisters EPA Method TO-15 And Modified EPA Method TO-14A

Company Name:	GHD Pty Ltd NT	Order No.:	12526136	Received:	Sep 16, 2021 12:00 AM
Address:	Level 7, 24 Mitchell Street Darwin NT 0800	Report #:	825235	Due:	Sep 23, 2021
Project Name:	DTC EPL MONITORING	Phone:	08 8982 0100	Priority:	5 Day
Project ID:	12526136	Fax:	08 8981 1075	Contact Name:	Liam Spurr

Eurofins Analytical Services Manager : Harry Bacalis

Sample Detail						Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	BTEXN (TOL5)
Melbourne Laboratory - NATA # 1261 Site # 1254									
Sydney Laboratory - NATA # 1261 Site # 18217									
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X	X
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	AQM01	Sep 14, 2021	6:00PM	6L Summa Canister	T21-Se34317	X	X	X	X
2	AQM02	Sep 14, 2021	6:00PM	6L Summa Canister	T21-Se34318	X	X	X	X
3	AQM03	Sep 14, 2021	6:00PM	6L Summa Canister	T21-Se34319	X	X	X	X
Test Counts						3	3	3	3

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. Dilutions are performed on samples due to the presence of high level target species or the presence of high level non-target species.
3. Results are uncorrected for surrogate recoveries.
4. All QC limit exceedances and affected sample results are noted by flags. Each qualifying flag is defined below in section entitled 'Definition of Data Qualifying Flags' and additionally on individual sample results (where relevant).
5. "100% certification" is defined as evaluating the sampling system with humid zero air/N₂ and humid calibration gases that pass through all active components of the sampling system. The system is "100% certified" if no significant additions or deletions (less than 0.2 ppbv each of target compounds) have occurred when challenged with the test gas stream.
6. The conversion equation from ppbv to g/m³ uses a temperature of 25 °C and an ambient sea level atmospheric pressure of 1 atmosphere (101.325 kPa) is assumed.
7. All canister samples are only analysed once temperature equilibrium with the laboratory has been achieved.
8. Safe Sampling Volume (SSV) - calculated by taking two-thirds of the breakthrough volume (direct method) and Appendix 1 of Method T0-17.
9. Samples were analysed on an 'as received' basis.
10. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
11. This report replaces any interim results previously issued.

Definition of Data Qualifying Flags

Qualifiers may have been used on the data analysis sheets and indicates as follows:

- A01 Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
- A02 Estimated value.
- A03 Exceeds instrument calibration range.
- A04 Saturated peak.
- A05 Exceeds quality control limits.
- A06 Compound analysed for but not detected above the Limit of Reporting (LOR). See data page for project specific U-flag definition.
- A07 Non-detected compound associated with low bias in the CCV.
- A08 The identification is based on presumptive evidence.
- A09 SSV has been exceeded for this compound. It is likely that this compound has been underestimated.
- A10 LORs cited do not take into account sample dilution due to canister pressurisation.
- A11 Naphthalene elutes outside the >C10-C12 range on the system used for sample analysis. As a result, >C10-C12 TRH value is equivalent to the modified F2 value.

Holding Times

Under conditions of normal usage for sampling ambient air, most Volatile Organic Compounds (VOCs) can be recovered from canisters near their original concentrations after storage times of up to thirty days. For thermal desorption tubes (TDT) samples should be refrigerated at <4°C in a clean environment during storage and analysed within 30 days of sample collection (within one week for limonene, carene, bis-chloromethyl ether and labile sulfur or nitrogen containing volatiles).

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 Sample Receipt Advice.

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.

Units

ppbv: parts per billion by volume

kPa: kilopascal

ug/m³: micrograms per cubic metre

psig: pounds per square inch gauge

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
BTEXN (TO15)							
Benzene	ug/m3	< 1.6			1.6	Pass	
Ethylbenzene	ug/m3	< 2.2			2.2	Pass	
m,p-Xylene	ug/m3	< 4.4			4.4	Pass	
o-Xylene	ug/m3	< 2.2			2.2	Pass	
Toluene	ug/m3	< 7.5			7.5	Pass	
Naphthalene	ug/m3	< 10.5			10.5	Pass	
LCS - % Recovery							
BTEXN (TO15)							
Benzene	%	94			70-130	Pass	
Ethylbenzene	%	108			70-130	Pass	
m,p-Xylene	%	107			70-130	Pass	
o-Xylene	%	113			70-130	Pass	
Toluene	%	99			70-130	Pass	
Naphthalene	%	72			70-130	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:

Harry Bacalis
Isaac McArthur

Analytical Services Manager
Senior Analyst-Air (QLD)



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 D

Results Tables



Appendix D
Table 1 - Groundwater Results

Darwin Turf Club
EPL Monitoring GME and Air Monitoring

			Well ID	MW02			MW03								
			Field ID	MW02_200117	MW02_200423	MW02_200428	MW03_200423	MW03_200428	MW03_200804	MW03_200908	MW03_200916	MW03_210420	MW03_210428	MW03_210907	MW03_210915
			Date	17/01/2020	23/04/2020	28/04/2020	23/04/2020	28/04/2020	4/08/2020	8/09/2020	16/09/2020	20/04/2021	28/04/2021	7/09/2021	15/09/2021
	Unit	EQL	Environment Protection Licence Trigger Levels (EPL218 Attachment B) (2018-2020)												
Field Parameters															
pH (Field)	pH units		6.0 - 8.0	5.86	5.46	5.45	4.76	4.67	5.02	4.81	5.60	5.22	5.21	5.85	5.96
Electrical conductivity (field)	µS/cm		20 - 250	505	528	490.1	582	586	406.4	422.8	529	481.1	491.5	545	487.6
DO (%S) (Field)	%S		80 - 110	27.4	5.6	8.3	13.2	5	4.0	-3.7	-0.3	0.5	0.8	2.9	3.0
Redox (Field)	mV			11.3	68.0	84.1	209.4	236.7	229.0	202.1	-0.2	183.2	204.2	133.6	102.9
Temperature (Field)	°C			34.8	34.8	34.2	34.0	33.8	32.8	33.6	33.9	32.8	32.8	32.1	33.7
Turbidity (Field)	NTU		2 - 15	89.1	0.76	0.41	22.1	0	9.56	1.00	2,197	0.79	1.8	66.11	-
Metals															
Arsenic (filtered)	mg/L	0.001	0.094	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium (filtered)	mg/L	0.0001	0.0004	<0.0001	0.0003	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	<0.0001
Chromium (III+VI) (filtered)	mg/L	0.001	0.006	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (filtered)	mg/L	0.001	0.0018	<0.001	0.011	0.002	0.008	0.002	0.009	0.007	0.012	0.011	<0.001	0.142	0.002
Lead (filtered)	mg/L	0.001	0.0056	<0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.008	<0.001
Mercury (filtered)	mg/L	0.0001	0.0019	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel (filtered)	mg/L	0.001	0.013	<0.001	0.010	<0.001	0.009	0.002	0.005	0.007	0.005	0.001	<0.001	0.021	0.001
Zinc (filtered)	mg/L	0.005	0.015	<0.005	0.113	0.007	0.048	0.010	0.040	0.039	0.038	0.010	<0.005	0.204	0.015
BTEXN															
Benzene	µg/L	1	300	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	µg/L	2	300	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Ethylbenzene	µg/L	2	5	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Xylene (o)	µg/L	2		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Xylene (m & p)	µg/L	2		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Xylene Total	µg/L	2	75	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Naphthalene	µg/L	5		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1
BTEX (Sum of Total) - Lab	µg/L	1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<5	<5
TRH - NEPM 2013															
F1 (C6-C10 minus BTEX)	µg/L	20		<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
C6-C10 Fraction	µg/L	20		<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
F2 (>C10-C16 minus	µg/L	100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C10-C16 Fraction	µg/L	100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
F3 (>C16-C34 Fraction)	µg/L	100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
F4 (>C34-C40 Fraction)	µg/L	100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C10-C40 (Sum of Total)	µg/L	100	600	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100



Appendix D
Table 1 - Groundwater Results

Darwin Turf Club
EPL Monitoring GME and Air Monitoring

			Well ID	MW04									
			Field ID	MW04_200117	MW04_200423	MW04_200428	MW04_200804	MW04_200908	MW04_200916	MW04_210420	MW04_210428	MW04_210907	MW04_210915
			Date	17/01/2020	23/04/2020	28/04/2020	4/08/2020	8/09/2020	16/09/2020	20/04/2021	28/04/2021	7/09/2021	15/09/2021
	Unit	EQL	Environment Protection Licence Trigger Levels (EPL 218 Attachment B) (2018-2020)										
Field Parameters													
pH (Field)	pH units		6.0 - 8.0	5.11	5.23	5.18	5.11	4.65	4.52	5.63	5.53	5.73	5.63
Electrical conductivity (field)	µS/cm		20 - 250	12521	6,273	6,729	9,850	18,810	20,888	7,055	8,828	24974	22088
DO (%S) (Field)	%S		80 - 110	32.1	20.1	14.8	11.3	2.81	-2.39	26.8	20.2	4.0	5.7
Redox (Field)	mV			193.3	213.1	229.2	302.6	247.2	225.9	145.9	229.3	-9.1	-60.9
Temperature (Field)	°C			32.3	33.6	33.3	31.9	32.5	33.2	33.5	33.2	32.2	32.6
Turbidity (Field)	NTU		2 - 15	1,160	47.99	8.16	4.56	301.9	63.10	0.83	1.63	0.00	-
Metals													
Arsenic (filtered)	mg/L	0.001	0.094	<0.001	<0.001	<0.001	<0.001	0.002	0.003	0.001	<0.001	0.004	0.004
Cadmium (filtered)	mg/L	0.0001	0.0004	0.0001	0.0001	0.0002	0.0005	0.0009	0.0015	0.0002	0.0003	0.0006	0.0005
Chromium (III+VI) (filtered)	mg/L	0.001	0.006	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (filtered)	mg/L	0.001	0.0018	<0.001	0.005	0.007	0.011	0.009	0.018	0.010	0.013	0.004	0.002
Lead (filtered)	mg/L	0.001	0.0056	0.004	<0.001	<0.001	0.001	0.002	0.003	<0.001	<0.001	<0.001	0.002
Mercury (filtered)	mg/L	0.0001	0.0019	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel (filtered)	mg/L	0.001	0.013	0.014	0.021	0.030	0.066	0.099	0.142	0.025	0.020	0.133	0.129
Zinc (filtered)	mg/L	0.005	0.015	0.067	0.093	0.140	0.291	0.430	0.571	0.095	0.074	0.461	0.450
BTEXN													
Benzene	µg/L	1	300	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	µg/L	2	300	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Ethylbenzene	µg/L	2	5	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Xylene (o)	µg/L	2		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Xylene (m & p)	µg/L	2		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Xylene Total	µg/L	2	75	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Naphthalene	µg/L	5		<5	<5	<5	<5	<5	<5	<5	<5	<1	<1
BTEX (Sum of Total) - Lab	µg/L	1		<1	<1	<1	<1	<1	<1	<1	<1	<5	<5
TRH - NEPM 2013													
F1 (C6-C10 minus BTEX)	µg/L	20		<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
C6-C10 Fraction	µg/L	20		<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
F2 (>C10-C16 minus	µg/L	100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C10-C16 Fraction	µg/L	100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
F3 (>C16-C34 Fraction)	µg/L	100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
F4 (>C34-C40 Fraction)	µg/L	100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C10-C40 (Sum of Total)	µg/L	100	600	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100



Appendix D
Table 1 - Groundwater Results

Darwin Turf Club
EPL Monitoring GME and Air Monitoring

			Well ID	MW05									
			Field ID	MW05_200117	MW05_200423	MW05_200428	MW05_200804	MW05_200908	MW05_200916	MW05_210420	MW05_210428	MW05_210907	MW05_210915
			Date	17/01/2020	23/04/2020	28/04/2020	4/08/2020	8/09/2020	16/09/2020	20/04/2021	28/04/2021	7/09/2021	15/09/2021
	Unit	EQL	Environment Protection Licence Trigger Levels (EPL218 Attachment B) (2018-2020)										
Field Parameters													
pH (Field)	pH units		6.0 - 8.0	5.93	5.59	5.67	6.28	5.96	6.04	4.89	5.66	6.61	6.39
Electrical conductivity (field)	µS/cm		20 - 250	107.3	95.1	93.6	77.4	112.0	110.4	230.5	99.4	96.6	85.8
DO (%S) (Field)	%S		80 - 110	69.3	81.7	85.3	95.7	89.1	96.8	51.8	80.7	78.4	83.6
Redox (Field)	mV			153.5	205.4	217.1	262.4	171.0	116.9	241.4	212.6	161.2	151.2
Temperature (Field)	°C			31.2	32.5	32.4	31.0	32.3	33.1	32.3	31.8	30.6	31.3
Turbidity (Field)	NTU		2 - 15	608	0.33	1.79	2.26	4.86	1.27	1.96	0.67	356.14	-
Metals													
Arsenic (filtered)	mg/L	0.001	0.094	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium (filtered)	mg/L	0.0001	0.0004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium (III+VI) (filtered)	mg/L	0.001	0.006	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (filtered)	mg/L	0.001	0.0018	<0.001	0.009	0.003	0.007	0.007	0.007	0.011	0.009	0.058	0.0020
Lead (filtered)	mg/L	0.001	0.0056	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	0.004	<0.001
Mercury (filtered)	mg/L	0.0001	0.0019	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel (filtered)	mg/L	0.001	0.013	<0.001	0.006	0.006	0.009	0.005	0.004	<0.001	<0.001	0.0090	<0.001
Zinc (filtered)	mg/L	0.005	0.015	<0.005	0.039	0.062	0.061	0.021	0.026	<0.005	<0.005	0.099	0.019
BTEXN													
Benzene	µg/L	1	300	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	µg/L	2	300	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Ethylbenzene	µg/L	2	5	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Xylene (o)	µg/L	2		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Xylene (m & p)	µg/L	2		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Xylene Total	µg/L	2	75	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Naphthalene	µg/L	5		<5	<5	<5	<5	<5	<5	<5	<5	<1	<1
BTEX (Sum of Total) - Lab	µg/L	1		<1	<1	<1	<1	<1	<1	<1	<1	<5	<5
TRH - NEPM 2013													
F1 (C6-C10 minus BTEX)	µg/L	20		<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
C6-C10 Fraction	µg/L	20		<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
F2 (>C10-C16 minus	µg/L	100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C10-C16 Fraction	µg/L	100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
F3 (>C16-C34 Fraction)	µg/L	100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
F4 (>C34-C40 Fraction)	µg/L	100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C10-C40 (Sum of Total)	µg/L	100	600	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100



Appendix D
Table 1 - Groundwater Results

Darwin Turf Club
EPL Monitoring GME and Air Monitoring

			Well ID	MW06									
			Field ID	MW06_200117	MW06_200423	MW06_200428	MW06_200804	MW06_200908	MW06_200916	MW06_210420	MW06_210428	MW06_210907	MW06_210915
			Date	17/01/2020	23/04/2020	28/04/2020	4/08/2020	8/09/2020	16/09/2020	20/04/2021	28/04/2021	7/09/2021	15/09/2021
	Unit	EQL	Environment Protection Licence Trigger Levels (EPL218 Attachment B) (2018-2020)										
Field Parameters													
pH (Field)	pH units		6.0 - 8.0	5.05	4.63	4.69	4.61	4.35	4.32	4.90	4.97	5.60	5.56
Electrical conductivity (field)	µS/cm		20 - 250	232.2	353.4	290.9	109.8	107.9	103.9	355.0	338.3	111.3	94.7
DO (%S) (Field)	%S		80 - 110	60.0	4.7	4.6	5.9	7.79	20.2	7.4	1.8	20.8	22.6
Redox (Field)	mV			221.5	208.1	201.9	283.1	245.1	249.8	215.5	219.9	195.5	181.9
Temperature (Field)	°C			32.5	33.0	32.4	31.7	33.5	34.1	31.6	31.2	32.4	32.3
Turbidity (Field)	NTU		2 - 15	359	1.56	4.66	11.02	7.94	12.10	1.87	2.10	395.5	-
Metals													
Arsenic (filtered)	mg/L	0.001	0.094	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.003
Cadmium (filtered)	mg/L	0.0001	0.0004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium (III+VI) (filtered)	mg/L	0.001	0.006	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (filtered)	mg/L	0.001	0.0018	<0.001	0.011	0.005	0.002	0.016	0.007	0.005	0.164	0.003	0.001
Lead (filtered)	mg/L	0.001	0.0056	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	0.006	<0.001	<0.001
Mercury (filtered)	mg/L	0.0001	0.0019	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel (filtered)	mg/L	0.001	0.013	<0.001	0.010	0.001	0.002	0.010	0.004	<0.001	0.022	0.001	0.001
Zinc (filtered)	mg/L	0.005	0.015	<0.005	0.065	0.021	0.011	0.060	0.028	0.014	0.206	0.018	0.015
BTEXN													
Benzene	µg/L	1	300	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	µg/L	2	300	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Ethylbenzene	µg/L	2	5	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Xylene (o)	µg/L	2		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Xylene (m & p)	µg/L	2		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Xylene Total	µg/L	2	75	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Naphthalene	µg/L	5		<5	<5	<5	<5	<5	<5	<5	<5	<1	<1
BTEX (Sum of Total) - Lab	µg/L	1		<1	<1	<1	<1	<1	<1	<1	<1	<5	<5
TRH - NEPM 2013													
F1 (C6-C10 minus BTEX)	µg/L	20		<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
C6-C10 Fraction	µg/L	20		<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
F2 (>C10-C16 minus	µg/L	100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C10-C16 Fraction	µg/L	100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
F3 (>C16-C34 Fraction)	µg/L	100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
F4 (>C34-C40 Fraction)	µg/L	100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C10-C40 (Sum of Total)	µg/L	100	600	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100



Appendix D
Table 1 - Groundwater Results

Darwin Turf Club
EPL Monitoring GME and Air Monitoring

			Well ID	MW07								
			Field ID	MW07_200423	MW07_200428	MW07_200804	MW07_200908	MW07_200916	MW07_210420	MW07_210428	MW07_210907	MW07_210915
			Date	23/04/2020	28/04/2020	4/08/2020	8/09/2020	16/09/2020	20/04/2021	28/04/2021	7/09/2021	15/09/2021
	Unit	EQL	Environment Protection Licence Trigger Levels (EPL218 Attachment B) (2018-2020)									
Field Parameters												
pH (Field)	pH units		6.0 - 8.0	4.24	4.17	4.81	4.53	4.07	4.46	4.45	5.46	5.04
Electrical conductivity (field)	µS/cm		20 - 250	176.4	186.4	1,651	2,599	1,710	281.8	331.4	2261	1925
DO (%S) (Field)	%S		80 - 110	31.3	28.3	6.5	1.30	25.6	20.5	31.6	11.9	20.5
Redox (Field)	mV			236.0	256.7	179.9	179.0	247.1	199.9	233.5	210.5	216.0
Temperature (Field)	°C			31.1	31.1	30.8	32.5	32.7	30.3	30.4	30.2	31.1
Turbidity (Field)	NTU		2 - 15	0	13	6.66	35.96	20.11	2.18	2.14	2.30	-
Metals												
Arsenic (filtered)	mg/L	0.001	0.094	<0.001	<0.001	0.004	0.004	0.001	<0.001	<0.001	0.003	0.001
Cadmium (filtered)	mg/L	0.0001	0.0004	<0.0001	<0.0001	0.0002	0.0002	0.0004	<0.0001	<0.0001	0.0003	0.0002
Chromium (III+VI) (filtered)	mg/L	0.001	0.006	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (filtered)	mg/L	0.001	0.0018	0.007	0.003	0.009	0.006	0.007	0.010	0.010	0.144	0.004
Lead (filtered)	mg/L	0.001	0.0056	0.002	<0.001	0.004	0.004	0.011	<0.001	0.003	0.012	0.006
Mercury (filtered)	mg/L	0.0001	0.0019	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel (filtered)	mg/L	0.001	0.013	0.008	0.002	0.008	0.007	0.010	<0.001	0.001	0.024	0.004
Zinc (filtered)	mg/L	0.005	0.015	0.056	0.012	0.062	0.020	0.031	<0.005	<0.005	0.208	0.022
BTEXN												
Benzene	µg/L	1	300	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	µg/L	2	300	<2	<2	<2	<2	<2	<2	<2	<2	<2
Ethylbenzene	µg/L	2	5	<2	<2	<2	<2	<2	<2	<2	<2	<2
Xylene (o)	µg/L	2		<2	<2	<2	<2	<2	<2	<2	<2	<2
Xylene (m & p)	µg/L	2		<2	<2	<2	<2	<2	<2	<2	<2	<2
Xylene Total	µg/L	2	75	<2	<2	<2	<2	<2	<2	<2	<2	<2
Naphthalene	µg/L	5		<5	<5	<5	<5	<5	<5	<5	<1	<1
BTEX (Sum of Total) - Lab	µg/L	1		<1	<1	<1	<1	<1	<1	<1	<5	<5
TRH - NEPM 2013												
F1 (C6-C10 minus BTEX)	µg/L	20		<20	<20	<20	<20	<20	<20	<20	<20	<20
C6-C10 Fraction	µg/L	20		<20	<20	<20	<20	<20	<20	<20	<20	<20
F2 (>C10-C16 minus	µg/L	100		<100	<100	<100	<100	<100	<100	<100	<100	<100
>C10-C16 Fraction	µg/L	100		<100	<100	<100	<100	<100	<100	<100	<100	<100
F3 (>C16-C34 Fraction)	µg/L	100		<100	<100	<100	<100	<100	<100	<100	<100	<100
F4 (>C34-C40 Fraction)	µg/L	100		<100	<100	<100	<100	<100	<100	<100	<100	<100
>C10-C40 (Sum of Total)	µg/L	100	600	<100	<100	<100	<100	<100	<100	<100	<100	<100



Appendix D
Table 2 - Air Toxics Results

Darwin Turf Club
EPL Monitoring GME and Air Monitoring

			Location ID	AQM01				AQM02				AQM03			
			Date	27/04/2020	15/09/2020	27/04/2021	14/09/2021	27/04/2020	15/09/2020	27/04/2021	14/09/2021	27/04/2020	15/09/2020	27/04/2021	14/09/2021
			Environment Protection Licence Trigger Levels (EPL218)*												
BTEXN															
Benzene	mg/m3	0.0016	0.010	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.004	<0.003	<0.003
Toluene	mg/m3	0.0075	3.766	0.0096	<0.0075	0.043	<0.0075	<0.0075	<0.0075	0.016	<0.0075	<0.0075	0.029	<0.0075	<0.0075
Ethylbenzene	mg/m3	0.0022		<0.004	<0.005	0.011	<0.004	<0.004	<0.003	0.0047	<0.004	<0.004	<0.005	<0.004	0.0039
Xylene (o)	mg/m3	0.0022	1.085	<0.004	<0.005	<0.004	<0.004	<0.004	<0.003	<0.004	<0.004	<0.004	<0.005	<0.004	<0.004
Xylene (m & p)	mg/m3	0.0044	2.170	<0.008	<0.009	0.033	<0.008	<0.009	<0.007	0.012	<0.008	<0.009	<0.01	<0.008	<0.008
PAHs - standard 16															
Naphthalene	mg/m3	0.0105		<0.021	<0.023	<0.018	<0.019	<0.022	<0.017	<0.019	<0.019	<0.022	<0.025	<0.019	<0.019



Appendix D - Table 3
Relative Percentage Difference Table

Lab Report Number			Date	7/09/2021		RPD	7/09/2021		RPD
			Field ID	MW04	QC108		MW04	QC208	
			Sample Type	ES2132702	ES2132702		ES2132702	824087	
				Normal	Field Duplicate		Normal	Interlab Duplicate	
	Unit	EQL							
Metals									
Arsenic (filtered)	mg/L	0.001	0.004	0.004	0	0.004	<0.005	0	
Cadmium (filtered)	mg/L	0.0001	0.0006	0.0005	18	0.0006	<0.001	0	
Chromium (III+VI) (filtered)	mg/L	0.001	<0.001	<0.001	0	<0.001	<0.001	0	
Copper (filtered)	mg/L	0.001	0.004	<0.001	120	0.004	<0.001	120	
Lead (filtered)	mg/L	0.001	<0.001	<0.001	0	<0.001	<0.005	0	
Mercury (filtered)	mg/L	0.0001	<0.0001	<0.0001	0	<0.0001	<0.0005	0	
Nickel (filtered)	mg/L	0.001	0.133	0.127	5	0.133	0.12	10	
Zinc (filtered)	mg/L	0.005	0.461	0.453	2	0.461	0.42	9	
BTEXN									
Benzene	µg/L	1	<1	<1	0	<1	<1	0	
Toluene	µg/L	1	<2	<2	0	<2	<1	0	
Ethylbenzene	µg/L	1	<2	<2	0	<2	<1	0	
Xylene (o)	µg/L	1	<2	<2	0	<2	<1	0	
Xylene (m & p)	µg/L	2	<2	<2	0	<2	<2	0	
Xylene Total	µg/L	2	<2	<2	0	<2	<3	0	
BTEX (Sum of Total) - Lab Calc	µg/L	1	<1	<1	0	<1	-	-	
Naphthalene	µg/L	5	<5	<5	0	<5	<10	0	
TRH - NEPM 2013									
F1 (C6-C10 minus BTEX)	µg/L	20	<20	<20	0	<20	<20	0	
C6-C10 Fraction	µg/L	20	<20	<20	0	<20	<20	0	
F2 (>C10-C16 minus Naphthalene)	µg/L	50	<100	<100	0	<100	<50	0	
>C10-C16 Fraction	µg/L	50	<100	<100	0	<100	<50	0	
F3 (>C16-C34 Fraction)	µg/L	100	<100	<100	0	<100	<100	0	
F4 (>C34-C40 Fraction)	µg/L	100	<100	<100	0	<100	<100	0	
>C10-C40 (Sum of Total)	µg/L	100	<100	<100	0	<100	<100	0	
TRH - NEPM 1999									
C6-C9 Fraction	µg/L	20	<20	<20	0	<20	<20	0	
C10-C14 Fraction	µg/L	50	<50	<50	0	<50	<50	0	
C15-C28 Fraction	µg/L	100	<100	<100	0	<100	<100	0	
C29-C36 Fraction	µg/L	50	<50	<50	0	<50	<100	0	
C10-C36 (Sum of Total)	µg/L	50	<50	<50	0	<50	<100	0	

-USGv#kdyh#rqd#ehhg#frqvlyhng#z khuh#B#frqfhqwdwrg#lv#j undwuh#kdq#h#p hv#kh#IT O:
--Hdydwng#USGv#huh#kj kj kvhg#dv#shu#DT F#Suribh#hwdjv#
-Dffhsdwded#USGv#huh#dfk#IT O#p xolsdu#dgjh#huh#4333#4#43#(IT O,#53#43#0#53#(IT O,#53#43#53#(IT O,#
---Iqwhude#Gxsdfdwv#huh#p dwfkhg#rq#hshu#frp srxgg#edv#dv#p hwrgv#ydu|#ehwz hhq#derudwuhv#
Dq|#p hwrgv#q#kh#rz #hdghu#hohv#r#krvh#kvng#g#kh#sup du|#derudwru|



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Darwin Turf Club - EPL Monitoring

Groundwater and Air Monitoring Report

Darwin Turf Club Inc

14 June 2022

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Project name		Darwin Turf Club - EPL Monitoring					
Document title		Darwin Turf Club - EPL Monitoring Groundwater and Air Monitoring Report					
Project number		12526136					
File name		12526136-REP_A_Darwin Turf Club EPL Monitoring Report April 2022.docx					
Status Code	Revision	Author	Reviewer		Approved for issue		
			Name	Signature	Name	Signature	Date
S4	0	C. George V.Milsom	M.Clough		N.Fries		10/06/2022

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1. Introduction

1.1 Background

Darwin Turf Club Incorporated (DTC) engaged GHD Pty Ltd (GHD) to undertake groundwater and air quality environmental monitoring at the Darwin Turf Club Fannie Bay Racecourse ('the Site'). GHD has undertaken the routine monitoring on behalf of DTC since April 2020, amounting to 11 groundwater monitoring events (GMEs) and five air quality monitoring events (AQMEs).

The monitoring of groundwater and air quality is a requirement of the Site's Environment Protection Licence (EPL), Appendix E, which was updated and issued to DTC by the Northern Territory Environment Protection Authority (NT EPA) on 14 April 2022.

DTC hold an Environmental Protection Licence 218-01 (EPL) which permits the application of oil to the racecourse surface, as part of soil conditioning and track maintenance works. NT EPA conditions contained within the EPL require DTC to undertake routine environmental monitoring of groundwater and air quality before, during, and after the application of oil to the track surface.

Measures associated with environmental protection are presented in the Fannie Bay Racecourse Environmental Management Plan (EMP) prepared by GHD in 2022 (GHD, 2022).

The EPL includes specific clauses relating to monitoring specifications, control measures, reporting and non-compliance notification requirements.

The environmental monitoring requirements documented in the EPL prescribe the following:

- A groundwater monitoring event (GME) to be conducted up to two weeks prior to the oil application to the track.
- A second GME must be conducted within 48 hours after the oil has been applied to the track surface.
- Additionally, an air quality monitoring event (AQME) must be conducted on the day of oil application, capturing ambient air during the application period.

Additional specifications on the monitoring requirements including monitoring locations are documented in the EMP (GHD, 2022).

1.2 Purpose of this report

The purpose of this report is to document the results obtained from the two GMEs and an AQME conducted by GHD during the April and May 2022 monitoring period on behalf of DTC. This report fulfils, in part, the requirements of the EMP and EPL under which DTC operates the racecourse facility.

Specifically, in fulfilment of Clause 43 relating to monitoring reporting requirements, this report was prepared in accordance with the requirements of the Northern Territory Contaminated Land Guideline (NT EPA, 2017), and therefore includes:

- Project background and site details
- Details on the adopted methodologies for the GMEs and AQME
- Assessment criteria adopted for evaluation of monitoring results
- Laboratory and field data obtained from the recent investigations
- A comparison of the historical and recent results against the relevant assessment criteria
- Summary conclusions of monitoring results, including a brief evaluation of the reported exceedances to the assessment criteria
- Recommendations based on the results from this monitoring period.

1.3 Scope

The following scope of work was undertaken:

- Two GMEs at seven groundwater bores as specified in the DTC Environmental Management Plan (EMP) (GHD, 2022). The GMEs were undertaken before and after track conditioning activities.
- One air quality sampling event at the three locations specified in EPL 218-01. The sampling was undertaken during track conditioning activities.
- Laboratory analysis of a sample of the oil mixture used for track conditioning.
- Preparation of a monitoring report (this report).

The environmental monitoring works were carried out in general accordance with:

- Australia and New Zealand Guidelines (ANZG) for Fresh and Marine Water Quality, 2018. This supersedes the previous guideline (Australian and New Zealand Environmental Conservation Council (ANZECC), 1992. Australian and New Zealand Guidelines (ANZG) for the Assessment and Management of Contaminated Sites)
- Australian Standards, 1998. Australian and New Zealand Guidelines for Water Quality Sampling, Australian Standard: AS5667.1.
- National Environment Protection Council (NEPC), 1999. National Environment Protection (Assessment of Site Contamination) Measure (NEPM), Assessment of Site Contamination, as amended April 2013 (ASC NEPM).
- Guidelines for groundwater quality protection in Australia – National Water Quality Management Strategy (DAWR, 2013).
- GHD, 2022. Environmental Management Plan for the Application of Use Oil – Fannie Bay Racecourse - Darwin Turf Club Inc

1.4 Limitations

This report: has been prepared by GHD for Darwin Turf Club and may only be used and relied on by Darwin Turf Club for the purpose agreed between GHD and Darwin Turf Club as set out in section 1 of this report.

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

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

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

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

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

Site conditions (including the presence of hazardous substances and/or site contamination) may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.

2. Site details

2.1 Site location and setting

Fannie Bay Racecourse comprises approximately 47ha and is situated approximately 4km north of Darwin CBD. The site is located off Dick Ward Drive.

The site is bound by Dick Ward Drive to the north, stables and Douglas Street to the east, Playford and Wells Street to the south and east. Residential properties bound Douglas Street, Playford Street and Wells Street.

The racecourse is located in close proximity to Ludmilla Primary School, residential areas of Fannie Bay and Ludmilla, and coastal areas. The activities undertaken at these sites are sensitive receptors to potential impacts from the application of waste oil to the racetrack.

A general layout of the site is provided in Figure 1.



Figure 1 Location of the Darwin Turf Club, Fannie Bay Racecourse

2.1.1 Climate

The site is located in the wet/dry tropics and is subject to annual periods of flood and drought. The dry season extends from approximately March to September, displaying moderate temperatures, low humidity and winds predominately from the east. The wet season occurs for the remaining months and tropical cyclones, thunderstorms and monsoon rain with winds predominately from the northwest are common, in association with high temperatures and humidity.

2.1.2 Geology and hydrogeology

The superficial geology underlying the site comprises unconsolidated sand, ferruginous and clayey, sandy and gravelly soils underlain by Kaolinitic Claystone (NTGS, 1985).

DEPWS (2000) indicates the southern portion of the site is underlain by a shallow freshwater aquifer, potentially suitable for human consumption and garden watering. The groundwater yield is less than 0.5 L/s. However, the map indicates that the northernmost 200 m of the site is likely to be underlain by shallow groundwater which is brackish to saline and unsuitable for most extractive uses, with a yield less than 0.5 L/s. It is likely that the groundwater towards the north is subject to saline influence from the Ludmilla Creek estuary. This is supported by results from MW04 which indicated electrical conductivity (EC) range from January 2020 to September 2021 of approximately 6,200 to 25,000 $\mu\text{S/cm}$ (13,800 $\mu\text{S/cm}$ average). The range is likely due to climatic effects (i.e., rainfall recharge). Average EC in other wells ranged from approximately 500 to 1200 $\mu\text{S/cm}$ for the same period. All wells are screened in the shallow aquifer.

Interpretation of groundwater standing water levels (SWLs) from the 2021 GME 9, indicated a generally northerly groundwater flow direction towards Ludmilla Creek wetland area (refer to Figure 2). Based on the contours, the hydraulic gradient is approximately 0.007 m/m.

2.1.3 Topography and hydrology

The site is relatively flat with the track approximately 0.5m above the surrounding ground level. Surface water drainage at the site generally flows from south to north.

The closest surface water feature is Ludmilla Creek and associated mangrove wetlands, situated approximately 500 m to the northeast of the site. It is assumed the surface water on the site ultimately drains into Ludmilla Creek which discharges into the Beagle Gulf.



Figure 2 Groundwater depth contours and flow direction

3. Groundwater monitoring methodology

3.1 Overview

This GME is the final event under the EPL 218-01, which is due to expire 31 August 2022. Two GMEs were undertaken on 20 April (GME 10) and 11 May (GME 11) 2022 in accordance with EPL 218-01 requirements. Seven boreholes were monitored as identified in Table 1. A borehole location plan is included in Figure 3.

The weather at the time of the GMEs is summarised below. Data was gathered from Darwin Airport weather station (Station No.: 014015):

- GME 10 – sunny with a maximum temperature of 34.3° Celsius (C). No rainfall was recorded.
- GME 11 – sunny with a maximum temperature of 34.5° C. No rainfall was recorded

Table 1 Groundwater sampling program

Bore ID	Location (in relation to racetrack)	Analytical suite
MW01	North	– Total Recoverable Hydrocarbons (TRH) – Benzene, Toluene, Ethylbenzene, o- & m- & p- Xylenes (BTEX) – Dissolved metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc)
MW02	North	
MW03	Northwest	
MW04	Northeast	
MW05	East	
MW06	South	
MW07	West	



Figure 3 Groundwater monitoring well locations

3.2 Sampling protocol

During each GME, the following activities were completed at each groundwater bore location:

- Each bore was visually inspected, and the bore condition was noted.
- The bore cap was removed, and the headspace was immediately monitored using a calibrated photo-ionisation detector (PID).
- An initial standing water level (SWL) reading was measured using a calibrated interface probe.
- Groundwater sampling was undertaken using low flow sampling techniques comprising a peristaltic pump and flow cell with calibrated YSI Pro DSS water quality meter.
- Purging was undertaken until the water quality parameters listed in Table 2 stabilised according to the definitions defined by the NT EPA Methodology for the Sampling of Groundwater (DIR, 2016)
- Samples were collected into laboratory supplied containers with appropriate preservative, as required.
- Samples for dissolved metals analysis were field filtered through a <0.45 µm disposable in-line filter.
- The samples were placed in chilled storage containers and transported under Chain of Custody (CoC) documentation to ALS Environmental Darwin, who organised transportation to ALS Environmental Sydney for analysis.
- Additional quality assurance / quality control (QAQC) samples were collected to maintain data quality.

SWLs, PID readings and field water quality parameters were measured using a calibrated interface probe, calibrated PID and calibrated YSI Pro DSS® water quality meter. The calibration certificates for this equipment are attached as Appendix A.

The Methodology for the Sampling of Groundwater (DPIR, 2016) was used to develop the groundwater methodology and uses the following Australian/New Zealand Standards:

- 5667.1:1998 Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples
- 5667.11:1998 Part 11 Guidance on sampling of ground waters

The volume of water in the bore has been calculated in Table 4 (Section 7.1) and uses the following calculation:

$$\text{Water Volume (Litres)} = \pi r^2 (D-SWL) \times 1000$$

r = radius of inner bore casing (in meters)

π = pi (3.14)

D = total depth of the bore (in meters)

SWL = Standing Water Level (distance from ground to water level, in meters).

3.3 Assessment criteria

The DTC Environmental Management Plan (GHD, 2022) documents assessment criteria for groundwater which are based on the Australian New Zealand Guidelines (ANZG) for Fresh and Marine Water Quality published in 2018. These criteria are referred to as Trigger Values in the EPL. They provide the basis upon which non-conformances with the EPL are based.

The assessment criteria are summarised in Table 2.

Table 2 Groundwater assessment criteria

Parameter	Units	Assessment criteria (Trigger Values)	Source
Field parameters			
pH	pH units	6.0 – 8.0	ANZECC guideline applicable to the Northern Territory for slightly disturbed ecosystems in tropical Australia to suit receiving environment
Turbidity	NTU	2 - 15	
Electrical conductivity	µS/cm	20 - 250	
Laboratory analysis			
Dissolved oxygen	% Saturation	80 - 110	ANZECC guideline applicable to the Northern Territory for slightly disturbed ecosystems in tropical Australia to suit receiving environment
Dissolved metals			
Arsenic	mg/L	0.094	95% protection level default trigger values provided in the ANZECC guideline for toxicants in slightly-moderately disturbed systems
Cadmium	mg/L	0.0004	
Chromium	mg/L	0.006	
Copper	mg/L	0.0018	
Lead	mg/L	0.0056	
Mercury	mg/L	0.0019	
Nickel	mg/L	0.013	
Zinc	mg/L	0.015	
Hydrocarbons			
Benzene	mg/L	0.3	Value provided in EMP derived from the ASC NEPM – Water Investigation Levels for Drinking and Freshwater Ecosystems
Toluene	mg/L	0.3	
Ethylbenzene	mg/L	0.005	
Xylenes	mg/L	0.075	
TRH (C ₁₀ –C ₃₆)	mg/L	0.6	

Clause 39 of the EPL states that a non-compliance with the EPL includes:

- 39.1 an exceedance of a trigger value specified in Attachment 1 on three consecutive sampling occasions; and
- 39.2 an exceedance of a trigger value specified in Attachment 1 on a single occasion where the parameter measures greater than or equal to three times or more the trigger value.

DTC must notify the EPA when a non-compliance has occurred, as detailed in the Clause 38 of the EPL.

Notification must include:

- 38.1 when the non-compliance was detected and by whom;
- 38.2 the date and time of the non-compliance;
- 38.3 the actual and potential causes and contributing factors to the non-compliance;
- 38.4 the risk of environmental harm arising from the non-compliance;
- 38.5 the action(s) that have or will be undertaken to mitigate any environmental harm arising from the non-compliance;
- 38.6 corrective actions that have or will be undertaken to ensure the non-compliance does not reoccur; and
- 38.7 if no action was taken, why no action was taken.

4. Air quality monitoring methodology

One ambient air quality monitoring event (AQME) was undertaken on 10 May 2022 to coincide with the track conditioning activities. Three locations were monitored which are typically down-wind of the track area: AQM01, AQM02 and AQM03, see Figure 4.

The weather at the time of the AQME is summarised below (Darwin Airport weather station: 014015):

- Temperature was recorded at a maximum of 34.4° C.
- No rainfall was recorded
- Wind direction was south to south-easterly, with gusts up to 41 km/h.



Figure 4 Locations for the air quality sampling

4.1 Sampling protocol

GHD commenced the air quality monitoring program at 06:30 on 10 May 2022. Portable canisters were placed at the three nominated sampling locations to collect a single round of air samples on the day of oil application to the track surface. The air monitoring used portable 6 L Summa® canisters, fitted with flow meters, to collect a single round of air samples. The Summa® canister draws a sample of air under vacuum and the flow meter controls the continuous intake of air for a period of 12 hours.

The Summa® canisters were then dispatched for analysis to Eurofins MGT, a NATA-accredited laboratory for analysis. At the time of deployment, the weather conditions were noted as: warm, humid, sunny with calm south-easterly winds.

Wind speed, wind direction, and temperature were measured during the application period with a calibrated ScarletTech™ anemometer fitted with a data recording device.

During the AQME, the following activities were completed at each sampling location:

- Portable canisters were calibrated for an ultra-low-level 12-hour fill time prior to setup.
- The pressure gauge on each of the canisters was checked to ensure a vacuum pressure of approximately -30 kPa within the canister, prior to sampling.
- The canisters were set up at each of sampling location prior to the commencement of track conditioning (oil application).
- At the time of deployment, the weather conditions were noted.
- The canisters were placed between 1.2 – 1.5 m above ground level.
- Once the canister fill period had expired, the canisters were recovered and transported under CoC documentation to Eurofins MGT for laboratory analysis.
- The samples were analysed for BTEX compounds.
- A weather monitoring station was deployed during the air quality sampling period to collect data on wind speed and direction and temperature to inform the assessment of air quality samples.
- Samples were analysed by the receiving laboratory using a laboratory that is NATA-accredited for the analysis method.

4.2 Assessment criteria

Assessment criteria specified in the DTC EMP (GHD, 2022) have been derived from the National Environment Protection (Air Toxics) Measure (NEPM) (NEPC, 2013). The assessment criteria are referred to as trigger values in the EPL and define the criteria for when a non-conformance with the EPL has occurred. The assessment criteria are summarised in Table 3.

Table 3 Air quality assessment criteria

Parameter	Units	Assessment criteria / Trigger Values	Source
BTEX			
Benzene	ppb	3	Value provided in EMP derived from the National Environment Protection (Air Toxics) Measure (NEPM)
Toluene	ppb	1,000	
Ethylbenzene	ppb	N/A	
o-Xylene	ppb	250	
m- & p- Xylenes	ppb	250	

5. Oil sampling methodology

As per the EPL 218-01 conditions provided on the 14 April 2022, analysis of a representative sample (where practicable) of the track conditioning oil was undertaken prior to application. Oil analysis was undertaken to ensure the composition is not contaminated by polychlorinated biphenyls and per- and polyfluoroalkyl substances (PFAS) to the lowest limit of laboratory reporting. The sample tested was the motor oil component of the mixture.

5.1 Sampling protocol

Oil that is applied to the track for conditioning was collected from Cleanaway on 20 April 2022.

Oil samples were collected into laboratory supplied containers with appropriate preservative, as required. Samples were immediately placed into chilled coolers and sent to NATA accredited laboratory.

6. Quality control and assurance

6.1 Field quality control methods

All field works were undertaken by experienced Environmental Scientists in accordance with GHD's standard operating procedures and in general compliance with ASC NEPM contamination sampling recommendations and requirements.

6.2 Blind and split duplicates

A single sample is divided into three separate sampling containers. The parent sample and the blind sample are sent anonymously to the primary project laboratory (ALS Environmental) with the split sample sent to the secondary laboratory (Eurofins MGT). Blind duplicates provide an indication of the analytical precision of the laboratory but are susceptible to influence by other factors such as sampling techniques and sample media heterogeneity. Split duplicate samples provide an indication of the repeatability of the results between laboratories.

One set of field duplicate samples (Field Duplicate and Interlab Duplicate) was collected and analysed as part of the QAQC analytical program. The precision of the data from these samples was assessed by calculating the Relative Percent Difference (RPD) between duplicate sample pairs, using the following formula:

$$RPD\% = \frac{|C_o - C_d|}{C_o + C_d} \times 100$$

C_o = Analyte concentration of the original sample

C_d = Analyte concentration of the duplicate sample

Nominal acceptance criteria of 30% and 50% were adopted for field duplicates of inorganics and organics, respectively. Blind and split duplicate samples should return RPDs within these criteria, however it is noted that the criteria will not always be achieved, particularly in heterogeneous media or when comparing low analyte concentrations. In the event RPD values exceed these limits, an explanation is offered for the source of these discrepancies in sample results.

6.3 Laboratory quality control methods

In addition to field QAQC procedures, the receiving laboratories also adopt internal QAQC procedures to ensure data quality and reliability. These procedures are required as part of their NATA-accreditation.

The nominated NATA accredited analytical laboratories (ALS Environmental and Eurofins MGT Laboratory) adopted their internal procedures and methods in accordance with their quality assurance systems. Results from these procedures are provided alongside the individual monitoring reports as appendices.

7. Groundwater monitoring results

7.1 Field observations and measurements

Bore condition notes are presented in **Error! Reference source not found.**. Generally, the bore network is in good condition and were accessible since reinstatement works for the Fannie Bay Racecourse groundwater monitoring network were completed in December 2021.

When gauging SWLs with an interface probe, non-aqueous phase liquid (NAPL) was not detected. PID readings obtained during gauging were within the acceptable limits defined by the EMP (refer to Table 4).

Water quality parameters were unable to be measured in MW01 and MW02 due to a blockage at ground level within the bore casing. The SWLs and water quality parameters for the remaining bores are recorded in Table 4. The full set of purge parameters are attached as Appendix B, for reference.

While gauging the wells with a PID, no hydrocarbons were detected in any of the monitoring wells. MW07 on 11 May could not be measured due to the cap being removed prior to monitoring.

Table 4 Monitoring well observations and depths

Monitoring well	Easting (m)	Northing (m)	Top of monitoring pipe (m AHD)	Ground surface (m AHD)	Volume of water within bore (as of 20/04/2022) (L)	Length of casing above ground (m)	PID (GME 10) (ppm)	PID (GME 11) (ppm)
MW01	700459.294	8626054.921	6.098	5.205	31.24	0.893	0.0	0.0
MW02	700468.771	8626066.059	6.142	5.141	30.48	1.001	0.0	0.0
MW03	700443.913	8626042.781	6.303	5.327	31.33	0.976	0.1	0.1
MW04	700707.819	8626092.343	5.866	4.793	32.40	1.073	0.0	0.0
MW05	700852.819	8625805.358	11.085	10.375	59.13	0.710	0.3	0.2
MW06	700784.599	8625421.479	14.393	13.768	85.40	0.625	0.0	0.1
MW07	700489.877	8625828.824	7.111	6.102	35.12	1.009	0.0	-

Table 5 GME 10 and GME 11 Groundwater field parameters

Bore ID	Bore depth (mbTOC)	SWL (mbTOC)	SWL (mbgl)*	Physical parameters						Comments/observations
				Temp (°C)	DO (mg/L)	DO (%S)	pH	EC (µS/cm)	ORP (Eh) # (mvV)	
GME 10 – 20/04/2022										
MW01	3.994	2.120	1.227	34.2	1.49	21.2	5.66	302.2	175.0	Orange to pale orange, very high turbidity, no odour, no sheen.
MW02	3.988	2.261	1.260	33.2	6.63	92.9	6.51	436.5	164.8	Orange to pale orange, very high turbidity, high sediment load (sandy), no odour, no sheen.
MW03	4.595	2.314	1.338	32.9	2.30	31.9	6.17	324.4	154.1	Clear to cloudy, low turbidity, no odour, no sheen.
MW04	5.007	1.740	0.667	35.3	2.68	38.0	5.85	17431	42.0	Clear to cloudy, no turbidity, H2S, no sheen. Organic matter in water samples was present.
MW05	5.470	3.556	2.846	32.1	5.48	74.8	5.58	145.2	147.6	Clear, no turbidity, no odour, no sheen.
MW06	6.621	4.145	3.520	32.4	2.66	36.5	5.33	343.8	195.0	Cloudy, no turbidity, no odour, no sheen. Bore was found un-capped.
MW07	6.033	2.640	1.631	30.7	3.27	43.7	4.90	149.1	225.6	Clear, no turbidity, no odour, no sheen.
GME 11 – 11/05/2022										
MW01	4.012	2.366	1.473	33.6	0.27	3.8	5.75	309.6	149.5	Cloudy white/orange, low turbidity, no odour, no sheen.
MW02	4.030	2.442	1.441	33.4	0.31	4.4	5.58	319.5	157.5	Orange, very high turbidity, no odour, no sheen. High sediment load. Existing tubing blocked from sediment – replaced.
MW03	4.605	2.572	1.596	33.5	0.11	1.5	5.58	333.8	140.5	Brown/yellow, medium turbidity, no odour, no sheen. Replaced existing bent and blocked tubing.
MW04	5.071	2.154	1.081	33.2	0.76	11.5	6.02	15605	-15.0	Slight cloudy white, very low turbidity, H2S odour, no sheen.
MW05	5.475	3.938	3.228	32.9	4.13	57.4	5.75	144.4	150.5	Clear, no turbidity, no odour, no sheen.
MW06	6.615	4.406	3.781	32.2	0.19	2.6	5.55	285.2	170.7	Slight cloudy, very low turbidity, no odour, no sheen.
MW07	6.026	3.007	1.998	31.1	2.13	28.7	5.11	127.0	198.3	Slight cloudy white to clear, very low to no turbidity, no odour, no sheen. No PID reading was taken at this well as EPA representative opened well cap prior.

N/A – Turbidity (Field) was not recorded.

mbTOC – metres below top of casing

mbgl – metres below ground level

not corrected to electrode

7.1.1 Pre-application GME field water quality parameters

A summary of the field parameters observed during the pre-application GME (GME 10) is provided below:

- Groundwater temperatures ranged between 30.7 and 35.3°C. These temperatures are typical of Top End groundwaters.
- DO concentrations indicate aerobic conditions in GME 10 with all values >1 mg/L.
- Field pH data indicates groundwater at the site was slightly to moderately acidic, ranging from 4.90 to 6.51 among the groundwater purge parameters. This pH is typical of groundwaters within shallow Top End aquifers.
- EC values ranged from 145.2 µS/cm in MW05 to 17,431 µS/cm in MW04. These values indicate that a wide range of salinities are present in groundwaters across the Site. The higher levels of EC indicate marine/estuarine influence on the groundwater, while the lower EC values tend to represent a freshwater environment with greater influence from rainfall infiltration.
- Turbidity field observations ranged from no turbidity to very high turbidity. The highest turbidity level was recorded at MW01 and MW02.

7.1.2 Post-application GME field water quality parameters

A summary of the field parameters observed during the post-application GME (GME 11) is provided below:

- Groundwater temperatures ranged between 31.1 and 33.6°C. These temperatures are typical of Top End groundwaters.
- With the exception of MW05 and MW07, DO concentrations indicated generally anerobic conditions during GME 11.
- Field pH data indicates groundwater at the site was slightly acidic, ranging from 5.11 to 6.02 among the groundwater purge parameters. This pH is typical of groundwaters within shallow Top End aquifers.
- EC values ranged from 127.0 µS/cm in MW07 to 15,605 µS/cm in MW04. These values indicate that a wide range of salinities are present in groundwaters across the Site. The higher levels of EC indicate marine influence on the groundwater, while the lower EC values tend to represent a freshwater environment with greater influence from rainfall infiltration.
- Turbidity field observations ranged from no turbidity to very high turbidity. The highest turbidity level was recorded at MW02 and MW03.

7.2 Laboratory results

Copies of the certified laboratory reports are attached as Appendix C. The results of the groundwater analysis are summarised in tables within Appendix D, presented against the relevant assessment criteria. Results for BTEX and TRH were not detected above the laboratory limit of reporting (LOR), with the majority of dissolved metals also reported below the laboratory LOR. Copper, Nickel and Zinc were detected in groundwater samples at concentrations above the adopted assessment criteria in several bores as detailed in Table 6.

A summary of individual analyte exceedances to the acceptance criteria are presented in Table 6.

Table 6 GME results exceedance summary

Analyte	Assessment criteria (GHD, 2022)	Unit	Exceedance concentration													
			MW01	MW02	MW03	MW04	MW05	MW06	MW07	MW01	MW02	MW03	MW04	MW05	MW06	MW07
Dissolved metals			GME 10							GME 11						
Copper	0.0018	mg/L	-	-	-	-	-	-	-	-	0.002	0.003	-	0.002	0.002	0.002
Nickel	0.013	mg/L	-	-	-	0.103	-	-	-	-	-	-	0.073	-	-	-
Zinc	0.015	mg/L	-	-	-	0.023	-	-	-	-	-	-	0.028	-	-	-
Field water quality parameters			GME 10							GME 11						
Field pH	6.0 – 8.0	pH units	5.66	-	-	5.85	5.58	5.33	4.9	5.75	5.58	5.58	-	5.75	5.55	5.11
Electrical conductivity (EC)	20 – 250	µS/cm	302.2	436.5	324.4	17431	-	343.8	-	309.6	319.5	333.8	15605	-	285.2	-
Dissolved oxygen (DO)	80 – 110	%	21.2	-	31.9	38	74.8	36.5	43.7	3.8	4.4	1.5	11.5	57.4	2.6	28.7

<AC – Reported within the relevant assessment criteria

N/A – No data available

As per EPL requirements described in Section 3.3, DTC is required to notify NT EPA of specific non-compliances with the EPL. Considering these non-compliance definitions, the results from the April/May 2022 monitoring period have been assessed and tabulated against these clause definitions. These are presented in Table 7 and Table 8.

Table 7 *EPL Clause 39.1: NT EPA notifiable exceedances: three consecutive exceedances*

Bore ID	Parameter/Analyte:	pH	DO	EC	Copper	Nickel	Zinc
	Assessment criteria:	6.0-8.0 (pH units)	80-110 (%)	20-250 (µS/cm)	0.0018 (mg/L)	0.013 (mg/L)	0.005 (mg/L)
MW03	GME 9	Nil	3.0	487.6	Nil	Nil	Nil
	GME 10	Nil	31.9	324.4			
	GME 11	Nil	1.5	333.8			
MW04	GME 9	Nil	5.7	22,088	Nil	0.129	0.450
	GME 10	Nil	38	17,431		0.103	0.023
	GME 11	Nil	11.5	15,605		0.073	0.028
MW06	GME 9	5.56	22.6	Nil	Nil	Nil	Nil
	GME 10	5.33	36.5				
	GME 11	5.55	2.6				
MW07	GME 9	5.04	20.5	Nil	Nil	Nil	Nil
	GME 10	4.90	43.7				
	GME 11	5.11	28.7				

Table 8 *EPL Clause 39.2: NT EPA notifiable exceedances: results greater than or equal to three times the assessment criteria*

Parameter/Analyte:	EC		DO		Copper		Nickel		Zinc	
	GME 10	GME 11	GME 10	GME 11	GME 10	GME 11	GME 10	GME 11	GME 10	GME 11
Assessment criteria:	20 – 250 µS/cm		80 – 110 %		0.0018 mg/L		0.013 mg/L		0.015 mg/L	
MW04	17,431	15,605	Nil	Nil	Nil	Nil	0.103	0.073	Nil	Nil

7.3 Discussion

The main differences observed in field parameters between the two GMEs were in DO and ORP. These suggest a more aerobic and oxidising environment before application of the oil. Some metal concentrations also increased in GME 11, where previously they were below laboratory LOR.

Coinciding with these changes was a slight decrease in SWLs in GME 11 compared to those recorded in GME 10. A review of rainfall data from the Bureau of Meteorology (BOM) website for the Darwin City station, indicated six rain events in April leading up to GME10 on 20 April. The total rainfall in this period was 88 mm. Only two rainfall events were reported after GME 10 and before GME 11 on 10 May, totalling 33.5 mm. The event prior to GME 11 was on 29 April. This might suggest the differences in DO and ORP reflect the more recent recharge of groundwater with rainwater prior to GME 10 than GME 11. This could also account for the changes in metals concentrations as the dilution effects of increased recharge seen in GME 10 reduce for GME 11. Given this and the lack of detectable hydrocarbons in the groundwater, it is likely the fluctuations observed are a natural phenomenon in response to climatic events and that the levels of metals are likely to represent background conditions.

Hence while the results suggest non-conformances, there is no evidence to suggest they are a result of the oil application or any other contamination source.

7.4 Quality control/Quality Assurance

7.4.1 Field quality control

In accordance with NEPM (2013) quality control requirements, one pair of duplicate samples is collected and analysed across the two GMEs, achieving a 1:10 primary-to-duplicate pair sampling ratio. These samples were collected alongside a nominated primary sample and analysed as a blind duplicate and split duplicate respectively.

Our chosen laboratory was unable to fulfil analysis on the blind and split duplicates on this occasion. The blind and split duplicates were both analysed in the same laboratory, rather than one duplicate being sent interlab. The duplicates that were analysed are summarised in Table 9. RPD calculations are presented in Appendix D.

Table 9 April/May 2022 GME QAQC sample summary

Parent sample	Duplicate sample	Laboratory	Analysis
MW04	Field Duplicate	ALS	– TRH – BTEX – 8 metals
	Field Duplicate	ALS	

The analytes had RPD values below the nominated data quality indicators for both GME 10 and GME 11. The overall dataset can be considered of sufficient quality and reliability to fulfil the requirements of this investigation.

7.5 Laboratory QAQC results

The analysis of matrix spikes, matrix spike duplicates, internal laboratory control samples and surrogates was undertaken by the laboratory. A summary of the laboratory quality control procedures is given below:

- All samples were received by the laboratory in good condition and chilled and within appropriate sample containers for analysis.
- Samples were extracted and analysed within appropriate holding times.
- The RPDs of the internal duplicated samples met the acceptable limits for all analytes.
- All matrix spike recoveries, matrix spike duplicates, surrogate spike recoveries, method blank recoveries and control sample recoveries were within acceptable range (laboratory's historical statistical range) except for the following:
 - TRH – Semivolatile Fraction (laboratory duplicate).
 - TRH – Semivolatile Fraction (matrix spike).

Laboratory QAQC reports are presented within the laboratory documentation in Appendix C.

8. Air quality monitoring results

8.1 Summary of air quality data

Weather data was collected through an on-site continuous weather monitoring device during the oil application period: 06:00 to 18:00 on 10 May 2022. These on-site weather monitoring results are summarised in Table 10. At the time of deployment, the weather conditions were noted as: warm, humid, sunny with calm, south-easterly winds.

Figure 5 displays the wind direction and speed over the 12-hour air quality monitoring period (10/05/2022 06:00 – 18:00) on a wind rose. The wind was southerly and easterly in the morning and northerly and westerly in the afternoon, at recorded wind speeds up to 9.2 km/h.

The weather data collected during the oil application period indicated the location of the three air quality monitoring locations: AQM01, AQM02, AQM03 was not optimal for this wind direction.

Table 10 May 2022 AQME Weather monitoring data

Parameters	AQM01	AQM02	AQM03
Canister deployment			
Date / Time	10/05/2022 06:10	10/05/2022 06:15	10/05/2022 06:25
Wind speed	6.1 km/h		
Wind direction	SSE		
Temperature	26°C		
Canister collection			
Date / Time	10/05/2022 17:45	10/05/2022 17:50	10/05/2022 18:00
Wind speed	2.5 km/h		
Wind direction	NW		
Temperature	32°C		

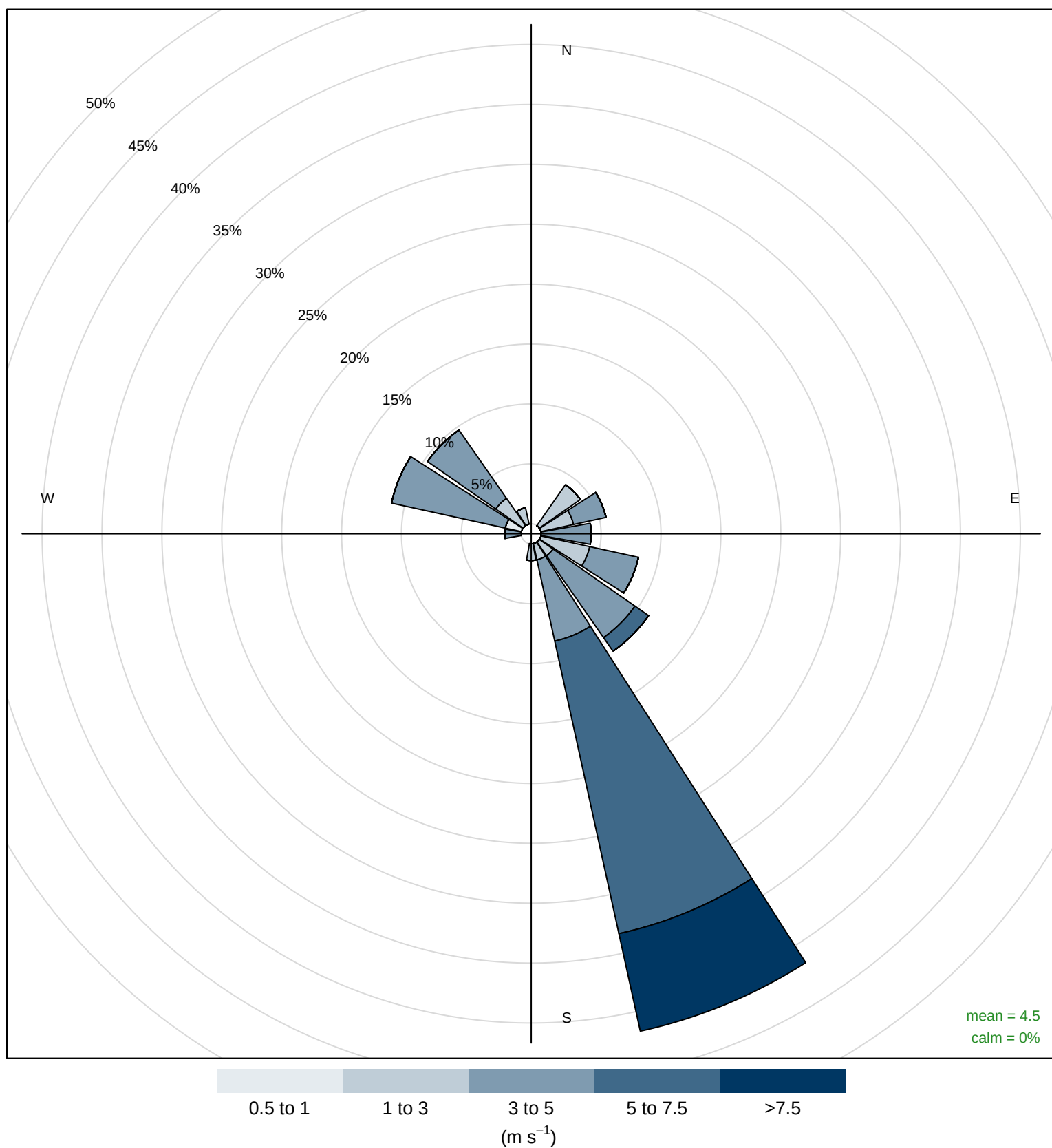


Figure 5

Wind direction and speed over the 12-hour period on oil application day

8.2 Laboratory results

Air quality results did not exceed the assessment criteria and were below the laboratory LOR at all locations monitored. The results are summarised in Table 11.

Table 11 May 2022 air quality monitoring results

Analyte	Assessment criteria (NEPM)	Unit	Sample pollutant concentration		
			AQM01	AQM02	AQM03
Benzene	0.010	ppb	<0.003	<0.003	<0.004
Toluene	3.766	ppb	<0.0075	<0.0075	<0.0075
Ethylbenzene	N/A	ppb	<0.004	<0.004	<0.005
o-Xylene	1.085	ppb	<0.004	<0.004	<0.005
m- & p- Xylenes	2.170	ppb	<0.009	<0.009	<0.01
Naphthalene	N/A	ppb	<0.022	<0.021	<0.025
NA – no assessment criterion					

9. Oil assessment results

Samples of the oil were collected prior to the application day as per the conditions of EPL 218-01. An outline of these results is presented in Table 12. The full results are presented in Appendix C.

Table 12 Oil assessment results

Analyte	Unit	LOR	Result
OC Pesticides			
Hexachlorobenzene	mg/kg	1.0	<30.0
Chlorinated Hydrocarbons	mg/kg	0.5	<30.0
PCBs	mg/kg	0.1	<0.2
SVOCs			
Hexachlorocyclopentadiene	mg/kg	2.5	<30.0
Hexachloroethane	mg/kg	0.5	<30.0
Hexachloropropylene	mg/kg	0.5	<30.0
Pentachlorobenzene	mg/kg	0.5	<30.0
VOCs	mg/kg	0.5	<30.0
PFAS - Sums			
Sum (PFHxS + PFOS)	µg/kg	0.01	<100
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)	µg/kg	0.01	<100
Sum of PFASs	µg/kg	0.01	<100
Sum of US EPA PFAS (PFOS + PFOA)	µg/kg	0.01	<100
Sum of WA DWER PFAS	µg/kg	0.05	<100

Due to matrix interference caused by dilution of the mixture the LOR was raised for each analyte. While the LOR for analytes is raised this is considered sufficient for the purpose of the assessment.

10. Conclusions and recommendations

10.1 Summary

Groundwater

Metal concentrations were detected, which sometimes exceeded the assessment criteria. However, there is a reduction in these concentrations, appearing in fewer locations and the magnitude of the detected concentrations has decreased in most of the results.

Laboratory analytical results reported concentrations below the laboratory LOR for the majority of analytes, with detections above the laboratory limit of reporting recorded for dissolved metals.

The results are summarised below:

- Comparing pre-application GME 10 (April 2022) and post-application GME 11 (May 2022), Zinc was detected post-application in MW03, during pre and post application in MW04 and MW06 and only pre- application in MW07. This does not show a pattern of an increase in detections for zinc post-application of oil.
- Nickel was detected during post-application in MW03, during pre- and post- application in MW04 and MW06, and only pre-application in MW07. This does not show a pattern of an increase in detections for nickel post-application of oil.
- Concentrations of copper were below the LOR in all monitoring bores sampled during the pre-application GME. Copper concentrations were detected above the LOR during post-application in all bores, with the exception of MW01. This shows a pattern of an increase in copper concentration across 6 of the 7 wells.
- Concentrations of copper were below the LOR in all monitoring bores sampled during the pre-application GME. Copper concentrations were detected above the LOR during post-application in all bores, with the exception of MW01. This shows a pattern of an increase in copper concentration across 6 of the 7 wells since the application of oil. However, this increase can be explained by natural changes in climatic conditions as discussed in section 7.3.
- Copper concentrations exceeded the adopted assessment criteria in all bores during GME 11, with the exception of MW01 and MW04, which was detected at the LOR.
- Nickel and Zinc exceeded the assessment criteria at MW04 during both GMEs. This is consistent with historical concentrations of Nickel and Zinc at this monitoring bore.
- Chromium, Lead and Mercury were below the LOR for all bores. Previous GMEs have occasionally reported exceedances for lead in groundwater, and no detectable concentrations for Chromium and Mercury in previous GMEs.
- Arsenic was below the LOR for all bores, with the exception of a detection above the LOR at MW04 during both GMEs. Detections did not exceed the assessment criteria.
- Cadmium was below the LOR for all bores, with the exception of MW03, which had a detectable concentration of 0.0001 during GME 11.
- MW04 reports notifiable exceedances, including three consecutive exceedances of Nickel and Zinc and concentrations of Nickel and EC greater than or equal to three times the assessment criteria during both GMEs.
- TRH and BTEX were below the laboratory detection limits in samples obtained from all sampling locations.
- pH concentrations were generally acidic across the site and ranged from 4.9 (MW07 in GME10) to 6.51 (MW02 in GME10). pH and EC exceeded the adopted assessment criteria in a number of bores.
- Groundwater EC values and pH are reflective of the nature of the site near the coast. Copper, Zinc and Nickel have been detected regularly throughout the GMEs undertaken to date and are likely to reflect natural background concentrations at the DTC. Higher EC values are indicative of saltwater naturally mixing with groundwater in coastal areas.

- Due to laboratory issues an interlab duplicate was not analysed. However, two field duplicates were analysed by ALS that show the RPD values are below the nominated data quality indicators and the results are of sufficient quality. The laboratory QAQC tests were also within an acceptable range, therefore the results collected are reliable.

Air quality

- The air quality monitoring was carried out on 10 May 2022, coinciding with the application of the waste oil mixture to the track. Air quality monitoring program returned no detectable concentrations in all three samples. This indicates that there are no impacts to residents in relation to the air quality during the oil application and tilling practices within the vicinity of the Darwin Turf Club. This is as expected as during the oil application, the wind direction was SSE, facing away from the residential properties.

Oil sampling

Waste oil analysis was undertaken to assess its composition prior to track application. Results indicated concentrations of all analytes tested (*TPH, BTEX, PCBs, chlorinated hydrocarbons and PFAS*) were below the LOR. However, the elevated laboratory LORs did not allow for conclusive assessment of the oil components.

10.2 Conclusion

The groundwater monitoring and air quality monitoring undertaken during the April/May 2022 reporting period has generally met the requirements of the EMP (GHD, 2022) and EPL 218-01-01.

The GME and AQME results from this reporting period indicate that the track conditioning activity undertaken at the DTC, under EPL 218-01-01, has not contributed hydrocarbon contamination to the surrounding environment.

The groundwater and air monitoring results indicate that the track conditioning activity undertaken at the Darwin Turf Club approved under EPL 218-01-01 does not pose a significant health risk to the surrounding receptors.

As per EPL requirements, DTC is required to notify NT EPA of specific non-compliances with the EPL. These are listed in this report (Table 7 and Table 8 in Section 7.2). However, it is likely that trigger values exceedances reflect natural background conditions and responses to climatic effects rather than the application of oil.

10.3 Recommendations

Considering the results of this monitoring report and that of previous monitoring activities, the following recommendations are proposed:

- It is recommended that an annual report should be produced, including historical data, in order to indicate the trends of the results detailed in this report and show that there are no significant impacts to the environment as a result of the waste oil application.
- Although the surrounding environment exhibits minimal to no impact from the track conditioning activities, groundwater and air quality monitoring should continue to be undertaken as per NT EPA and EMP requirements.
- Potentially add PFAS to water and soil sampling as an alternative appropriate test to direct oil testing.

11. References

Australia and New Zealand Guidelines (ANZG), 2018. Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Governments and Australian state and territory governments, Canberra, ACT, Australia. Accessed 25 May 2022. Available from **Water Quality Guidelines Home**

Australian and New Zealand Environment Conservation Council (ANZECC) & Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ), 2000. Australian guidelines for water quality monitoring and reporting: National water quality management strategy No. 7. Accessed 15 May 2022. Available from **ANZECC & ARMCANZ (2000) guidelines (waterquality.gov.au)**

Department of Agriculture and Water Resources (DAWR, 2013). Guidelines for groundwater quality protection in Australia – National Water Quality Management Strategy. Commonwealth of Australia. Accessed 25 May 2022. Available from **Guidelines for groundwater quality protection in Australia**

Department of Primary Industry and Resources (DPIR), 2016. Methodology for the Sampling of Groundwater. Northern Territory Government. Accessed 19 May 2022. Available from **Methodology for the Sampling of Groundwater (nt.gov.au)**

GHD (2022) *Environmental Management Plan for the Application of Used Oil*.

Northern Territory Environmental Protection Authority (2017) *Northern Territory Contaminated Land Guideline*. Accessed 15 May 2022. Available from **Document Type**

Appendices

Appendix A

Calibration Certificates

Instrument **Geotech Interface Meter (30M)**
Serial No. **5364**



Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Compartment	✓	
	Capacity	✓	
Probe	Cleaned/Decon.	✓	
	Operation	✓	
Connectors	Condition	✓	
		✓	
Tape Check	Cleaned	✓	
Connectors	Checked for cuts	✓	
Instrument Test	At surface level	✓	

Certificate of Calibration

This is to certify that the above instrument has been cleaned and tested.

Calibrated by: Anoop Kumar

Calibration date: 4/04/2022

Next calibration due: 01-Oct-22

Multi Parameter Water Meter

Instrument **YSI Pro DSS**
Serial No. **21C100547**



Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
	Recharge OK?	✓	
Switch/keypad	Operation	✓	
Display	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	1. pH/ORP	✓	
	2. Turbidity	✓	
	3. Conductivity	✓	
	4. D.O	✓	
	5. Temp	✓	
	6. Depth	x	
Alarms	Beeper		
	Settings		
Software	Version		
Data logger	Operation		
Download	Operation		
Other tests:			

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
Temp					19.8
pH 7		pH 7.00		374422	7.01
pH 4		pH 4.00		363894	4.00
EC		Zero in Air			0.002mS/cm
EC		2.76mS		368682	2.76mS/cm
ORP		240mv @ 20°C		367761 / 367458	249.6
DO		Na ² SO ³ Zero		10959	0.1%
DO 100%		100%		Water Saturated Air	100%
Turbidity		0 NTU		Distilled water	0.5
Turbidity		100 NTU		358013	100

Calibrated by: Anoop Kumar

Calibration date:

4/04/2022

PID Calibration Certificate

Instrument **PhoCheck Tiger**
Serial No. **T-105520**



Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments			
Battery	Charge Condition	✓				
	Fuses	✓				
	Capacity	✓				
	Recharge OK?	✓				
Switch/keypad	Operation	✓				
Display	Intensity	✓				
	Operation (segments)	✓				
Grill Filter	Condition	✓				
	Seal	✓				
Pump	Operation	✓				
	Filter	✓				
	Flow	✓				
	Valves, Diaphragm	✓				
PCB	Condition	✓				
Connectors	Condition	✓				
Sensor	PID	✓	10.6 ev			
Alarms	Beeper	✓	Low	High	TWA	STEL
	Settings	✓	50ppm	100ppm		
Software	Version	✓				
Data logger	Operation	✓				
Download	Operation	✓				
Other tests:						

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Diffusion mode Aspirated mode

Sensor	Serial no	Calibration gas and concentration	Certified	Gas bottle No		Instrument Reading
PID Lamp		100ppm Isobutylene	NIST	1443932		101

Calibrated by: Anoop Kumar

Calibration date: 4/04/2022

Appendix B

Field Results

Field Data - April/May 2022

Groundwater Gauging

Well ID	Date/Time	Water Depth (mbTOC)	Well Depth (mbTOC)	Method	Dry	Comments	PID (ppm)
MW01	17/01/2020 12:30	-	0.780	Dip	Y	Well dry	0.0
	23/04/2020 11:21	-	0.780	Dip	Y	Well dry	0.1
	28/04/2020 10:58	-	0.780	Dip	Y	Well dry	0.0
	04/08/2020 11:58	-	0.780	Dip	Y	Well dry	0.0
	08/09/2020 10:00	-	0.770	Dip	Y	Well dry	0.0
	16/09/2020 09:33	-	0.770	Dip	Y	Well dry	0.0
	20/04/2021 13:30	-	0.780	Dip	Y	Well dry	0.0
	28/04/2021 11:44	-	0.780	Dip	Y	Well dry	0.0
	07/09/2021 11:30	-	-	Dip	Y	Well dry	0.0
	15/09/2021 11:25	-	-	Dip	Y	Well dry	0.0
	20/04/2022 12:30	2.120	3.994	Dip	N	New well. Orange, very high to medium turbidity, no odour, no sheen	0.0
	11/05/2022 11:40	2.366	4.012	Dip	N	Orange, low to very low turbidity, no odour, no sheen	0.0
MW02	17/01/2020 12:31	0.941	1.780	Dip	N	Clear with organic matter, no odour, no sheen - Bail	0.0
	23/04/2020 11:27	1.346	1.750	Dip	N	Clear, odour, no sheen	0.0
	28/04/2020 10:59	1.443	1.750	Dip	N	Clear, odour, no sheen	0.0
	04/08/2020 12:00	-	1.750	Dip	Y	Well dry	0.0
	08/09/2020 10:05	-	1.750	Dip	Y	Well dry	0.0
	16/09/2020 09:35	-	1.750	Dip	Y	Well dry	0.0
	20/04/2021 13:20	1.428	1.750	Dip	N	Insufficient water in the column to purge and take samples	0.0

Well ID	Date/Time	Water Depth (mbTOC)	Well Depth (mbTOC)	Method	Dry	Comments	PID (ppm)
	28/04/2021 11:40	1.523	1.750	Dip	N	Insufficient water in the column to purge and take samples	0.0
	07/09/2021 11:35	-	-	Dip	Y	Well dry	0.0
	15/09/2021 11:20	-	-	Dip	Y	Well dry	0.0
	20/04/2022 13:00	2.261	3.988	Dip	N	New well. Orange, very high turbidity, no odour, no sheen	0.0
	11/05/2022 12:30	2.442	4.030	Dip	N	Orange. Extremely high turbidity, no odour, no sheen	0.0
MW03	17/01/2020 12:29	1.467	4.640	Dip	N	Unable to get bailer down well	0.0
	23/04/2020 10:56	2.157	4.630	Dip	N	Clear, no odour, no sheen	0.1
	28/04/2020 10:15	2.264	4.630	Dip	N	Clear, no odour, no sheen	1.2
	04/08/2020 11:21	2.876	4.650	Dip	N	Slightly cloudy, no odour, no sheen	0.0
	08/09/2020 11:37	3.040	4.640	Dip	N	Slightly cloudy, no odour, no sheen	0.0
	16/09/2020 09:30	3.085	4.630	Dip	N	Pale brown cloudy, clearing up, no odour, no sheen	0.1
	20/04/2021 12:56	2.690	4.640	Dip	N	Clear, no odour, no sheen, low turbidity	0.0
	28/04/2021 11:50	2.789	4.680	Dip	N	Clear, no odour, no sheen, no turbidity	0.1
	07/09/2021 11:55	3.248	4.640	Dip	N	High turbidity, Red/brown colour, no odour, becoming clear	0.2
	15/09/2021 12:30	3.314	4.610	Dip	N	Brown-grey, medium turbidity, clearing up, no odour, no sheen	0.2
	20/04/2022 12:00	2.314	4.595	Dip	N	Cloudy, low turbidity, no odour, no sheen	0.1
	11/05/2022 11:00	2.572	4.605	Dip	N	Brown, very high turbidity, no odour, no sheen	0.1
MW04	17/01/2020 13:00	1.804	6.030	Dip	N	Orange/brown, moderate sediment load, no odour, no sheen	0.0
	23/04/2020 12:07	2.081	6.070	Dip	N	Slightly cloudy/milky, no odour, no sheen	0.3
	28/04/2020 11:44	1.965	6.070	Dip	N	Slightly cloudy/milky, no odour, no sheen	0.8
	04/08/2020 12:05	2.605	6.030	Dip	N	Clear, no odour, no sheen	0.0
	08/09/2020 11:37	-	-	Dip	N	Unable to get IP probe through bend in PVC piping. Water was white-red slightly cloudy, light sheen	0.0
	16/09/2020 11:07	2.968	5.040	Dip	N	Water slightly yellow-hazy, no odour, no sheen	0.0
	20/04/2021 11:56	2.148	6.030	Dip	N	Bailer stuck in well. turbid initially (mostly due to disturbance of attempting to retrieve bailer). Yellow in colour. clearing after 0.5L. Cloudy. low turbidity, no odour, no sheen	3.7

Well ID	Date/Time	Water Depth (mbTOC)	Well Depth (mbTOC)	Method	Dry	Comments	PID (ppm)
	28/04/2021 11:02	2.297	6.030	Dip	N	Clear, no odour, no sheen, no turbidity	1.3
	07/09/2021 11:15	-	-	Dip	N	Bore blocked at ground level. High turbidity, becoming clear. No odour, no sheen	0.0
	15/09/2021 11:30	2.870	5.090	Dip	N	SWL and bore depth measured through gap in broken casing at ground level. Clear, no turbidity, H ₂ S odour, no sheen	0.0
	22/04/2022 13:30	1.740	5.007	Dip	N	Clear, no turbidity, H ₂ S odour, no sheen	0.0
	11/05/2022 13:15	2.154	5.071	Dip	N	Cloudy white, low turbidity, H ₂ S odour, no sheen	0.0
MW05	17/01/2020 13:30	3.325	5.480	Dip	N	Brown, slightly turbid, no odour. no sheen - Bailer	0.0
	23/04/2020 13:08	3.759	5.470	Dip	N	Clear, no odour, no sheen	0.0
	28/04/2020 12:40	3.781	5.470	Dip	N	Clear, no odour, no sheen	0.1
	04/08/2020 12:48	3.809	5.480	Dip	N	Clear, no odour, no sheen	0.0
	08/09/2020 12:11	3.932	5.470	Dip	N	Clear, no odour, no sheen	0.0
	16/09/2020 09:20	3.854	4.470	Dip	N	Clear, no odour, no sheen	0.0
	20/04/2021 11:26	3.921	5.470	Dip	N	Clear, no odour, no sheen, no turbidity	0.2
	28/04/2021 10:30	3.656	5.460	Dip	N	Clear, no odour, no sheen, no turbidity	0.2
	07/09/2021 10:40	5.061	5.470	Dip	N	High turbidity Initially - Brown in colour, clearing up	0.2
	15/09/2021 10:50	5.185	5.480	Dip	N	Low turbidity, no odour, no sheen, then clearing up	1.1
	22/04/2022 14:00	3.556	5.470	Dip	N	Clear, no turbidity, no odour, no sheen	0.3
	11/05/2022 13:45	3.928	5.475	Dip	N	Clear, no turbidity, no odour, no sheen	0.2
MW06	17/01/2020 14:10	3.468	6.600	Dip	N	Cloudy brown, moderate sediment load, no odour, no sheen - Bailer	0.2
	23/04/2020 09:03	4.376	6.610	Dip	N	Clear, no odour, no sheen	0.0
	28/04/2020 08:47	4.418	6.610	Dip	N	Clear, no odour, no sheen	0.8
	04/08/2020 08:52	5.244	6.600	Dip	N	Clear, no odour, no sheen	0.0
	08/09/2020 12:55	5.481	6.580	Dip	N	Clear, no odour, no sheen	0.0
	16/09/2020 09:15	3.824	6.600	Dip	N	Clear, no odour, no sheen	0.0
	20/04/2021 10:47	4.405	6.590	Dip	N	High turbidity initially, cleared after 200mL (tubing at base of well, then raised up higher). Clear, no odour, no sheen, no turbidity	0.2

Well ID	Date/Time	Water Depth (mbTOC)	Well Depth (mbTOC)	Method	Dry	Comments	PID (ppm)
	28/04/2021 09:00	4.540	6.530	Dip	N	Cloudy (yellowish brown), no odour, no sheen, low turbidity. Clear by 0.5 L	0.2
	07/09/2021 12:30	5.570	6.200	Dip	N	High turbidity - red/brown colour. Becoming clear	0.2
	15/09/2021 09:37	5.624	6.640	Dip	N	Orange, very high turbidity, no odour, no sheen. Then high turbidity	0.8
	22/04/2022 15:00	4.145	6.621	Dip	N	Cloudy, low turbidity, no odour, no sheen	0.0
	11/05/2022 14:05	4.406	6.615	Dip	N	Cloudy, very low turbidity, no odour, no sheen	0.1
MW07	17/01/2020 10:40	2.529	6.040	Dip	N	Bore bent, unable to get bailer down well	0.5
	23/04/2020 10:01	2.869	6.050	Dip	N	Clear, no odour, no sheen	0.8
	28/04/2020 09:36	2.984	6.050	Dip	N	Clear, no odour, no sheen	0.1
	04/08/2020 10:02	3.605	6.030	Dip	N	Clear, no odour, no sheen	0.0
	16/09/2020 09:02	3.824	6.050	Dip	N	Clear, no odour, no sheen	0.1
	20/04/2021 09:55	2.948	6.040	Dip	N	Clear, no odour, no sheen, no turbidity	0.6
	28/04/2021 09:44	3.053	6.040	Dip	N	Clear, no odour, no sheen, no turbidity	0.3
	08/09/2020 13:42	3.774	6.010	Dip	N	Clear, no odour, no sheen	0.0
	07/09/2021 09:40	3.554	6.050	Dip	N	Clear, no turbidity, no odour, no sheen	0.1
	15/09/2021 08:25	3.635	6.040	Dip	N	Clear, no turbidity, no odour, no sheen	0.0
	22/04/2022 11:30	2.640	6.033	Dip	N	Clear, no turbidity, no odour, no sheen	0.0

Well ID	Date/Time	Water Depth (mbTOC)	Well Depth (mbTOC)	Method	Dry	Comments	PID (ppm)
	11/05/2022 14:35	2.897	6.026	Dip	N	Slightly cloudy, very low turbidity, no odour, no sheen. PID not taken, NT EPA opened casing an hour prior.	-

Stabilisation Results

Well ID	Date	Time	Purge Vol. (L)	Purge SWL (mbTOC)	pH Field (pH)	EC Field $\mu\text{S/cm}$	DO Field (mg/L)	DO Field (%S)	ORP Field (mV)	Temp Field (°C)
MW01	20/04/2022	12:30	0.5	2.120	5.61	151.4	2.05	28.8	172.9	33.5
		12:35	1.0	2.120	5.62	145.9	1.71	24.0	161.2	33.5
		12:40	1.5	2.122	5.66	302.2	1.49	21.2	175.0	34.2
	11/05/2022	11:40	0.5	2.366	6.65	309.6	0.61	8.7	146.7	33.7
		11:45	1.0	2.370	6.11	309.6	0.43	6.1	149.3	33.7
		11:50	1.5	2.372	5.85	309.5	0.31	4.4	147.6	33.6
		11:55	2.0	2.375	5.81	309.6	0.30	4.2	148.0	33.7
		12:00	2.5	2.376	5.75	309.6	0.27	3.8	149.5	33.6
MW02	20/04/2022	13:00	0.5	2.263	6.83	438.7	6.63	94.2	183.2	34.0
		13:05	1.0	2.264	6.51	437.2	6.67	93.8	172.8	33.4
		13:10	1.5	2.265	6.51	436.5	6.63	92.9	164.8	33.2
	11/05/2022	12:30	0.5	2.442	6.11	332.2	3.69	52.2	156.8	33.4
		12:35	1.0	2.508	5.87	328.9	2.74	38.4	160.9	33.5
		12:40	1.5	2.627	5.83	326.5	1.52	29.5	162.2	33.5
		12:45	2.0	2.700	5.67	325.1	1.20	15.8	163.3	33.4
		12:50	2.5	2.803	5.58	321.5	0.66	9.3	165.7	33.4
		12:55	3.0	2.893	5.58	319.7	0.47	6.8	159.8	33.4
		13:00	3.5	2.971	5.58	319.3	0.29	4.1	158.5	33.4

Well ID	Date	Time	Purge Vol. (L)	Purge SWL (mbTOC)	pH Field (pH)	EC Field µS/cm	DO Field (mg/L)	DO Field (%S)	ORP Field (mV)	Temp Field (°C)
MW03	20/04/2022	13:05	4.0	3.040	5.58	319.5	0.31	4.4	157.5	33.4
		12:00	0.5	2.314	5.91	320.0	1.98	27.7	174.8	33.3
		12:05	1.0	2.314	5.90	318.8	1.28	27.7	164.6	33.3
		12:10	1.5	2.317	6.16	320.7	1.99	27.4	165.5	33.0
	11/05/2022	12:15	2.0	2.320	6.17	324.4	2.30	31.9	154.1	32.9
		11:00	0.5	2.577	7.00	371.8	3.00	0.21	132.6	33.5
		11:05	1.0	2.578	5.51	345.5	2.20	0.16	134.3	33.5
		11:10	1.5	2.578	5.53	340.8	1.82	0.13	135.4	33.6
		11:15	2.0	2.580	5.54	330.4	1.70	0.12	139.8	33.6
		11:20	2.5	2.580	5.58	333.8	1.58	0.11	140.5	33.5
MW04	20/04/2022	13:30	0.5	1.741	6.04	17477	3.09	47.0	57.3	35.0
		13:35	1.0	1.741	5.93	17402	2.72	41.6	42.2	35.3
		13:40	1.5	1.741	5.85	17431	2.68	38.0	42.0	35.3
	11/05/2022	13:15	0.5	2.160	6.03	11205	0.13	1.9	-3.4	34.9
		13:20	1.0	2.289	6.01	13071	0.40	6.1	-8.2	35.0
		13:25	1.5	2.325	6.01	15764	0.58	8.8	-12.4	35.1
		13:30	2.0	2.370	6.03	15611	0.83	12.5	-17.4	35.2
		13:35	2.5	2.413	6.02	15605	0.76	11.5	-15.0	35.2
MW05	20/04/2022	14:00	0.5	3.556	6.05	152.1	5.74	79.3	87.8	32.5
		14:05	1.0	3.558	5.79	145.3	6.00	83.0	119.7	32.1
		14:10	1.5	3.561	5.58	145.2	5.48	74.8	147.6	32.1
	11/05/2022	13:45	0.5	3.973	5.74	148.0	4.26	59.4	143.2	33.1
		13:50	1.0	4.215	5.76	143.9	4.20	58.4	148.7	33.0
		13:55	1.5	4.318	5.76	144.6	4.17	58.0	149.6	32.9
		14:00	2.0	4.401	5.75	144.4	4.13	57.4	150.5	32.9

Well ID	Date	Time	Purge Vol. (L)	Purge SWL (mbTOC)	pH Field (pH)	EC Field μS/cm	DO Field (mg/L)	DO Field (%S)	ORP Field (mV)	Temp Field (°C)
MW06	20/04/2022	15:00	0.5	4.150	5.28	344.1	3.25	44.8	180.2	32.2
		15:05	1.0	4.152	5.28	347.1	2.31	31.8	190.7	32.3
		15:10	1.5	4.160	5.33	343.8	2.66	36.5	195.0	32.4
	11/05/2022	14:05	0.5	4.408	5.81	273.3	0.29	3.9	169.6	32.3
		14:10	1.0	4.413	5.64	280.6	0.23	3.2	170.7	32.3
		14:15	1.5	4.415	5.61	282.9	0.22	3.1	170.7	32.3
		14:20	2.0	4.417	5.56	284.8	0.20	2.7	170.7	32.2
		14:25	2.5	4.420	5.55	285.2	0.19	2.6	170.7	32.2
MW07	20/04/2022	11:30	0.5	2.640	4.67	862.0	2.59	35.2	210.1	31.4
		11:35	1.0	2.640	4.86	383.7	3.37	45.2	216.2	30.7
		11:40	1.5	2.640	4.90	149.1	3.27	43.7	225.6	30.7
	11/05/2022	14:35	0.5	2.990	5.93	350.2	1.61	22.0	189.0	31.2
		14:40	1.0	2.995	5.42	140.7	2.38	32.4	190.7	31.1
		14:45	1.5	2.999	5.19	130.9	2.25	30.2	196.2	31.1
		14:50	2.0	3.003	5.11	126.5	2.15	28.9	198.2	31.1
		14:55	2.5	3.007	5.11	127.0	2.13	28.7	198.3	31.1

Appendix C

Laboratory Results

CERTIFICATE OF ANALYSIS

Work Order : **ES2213692**
Client : **GHD PTY LTD**
Contact : Charlotte George
Address : Level 7 24 Mitchell Street
 DARWIN NT, AUSTRALIA 0800
Telephone : ----
Project : 12526136 Darwin Turf Club Monitoring Event
Order number : ----
C-O-C number : ----
Sampler : Charlotte George
Site : ----
Quote number : SY/090/22 V3
No. of samples received : 9
No. of samples analysed : 7

Page : 1 of 7
Laboratory : Environmental Division Sydney
Contact : Sarah Mathew
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-2-8784 8555
Date Samples Received : 22-Apr-2022 15:30
Date Analysis Commenced : 22-Apr-2022
Issue Date : 29-Apr-2022 16:42



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>
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, 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.



Analytical Results

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

Sample ID

				MW01	MW02	MW03	MW04	MW05
Sampling date / time				20-Apr-2022 00:00	20-Apr-2022 00:00	20-Apr-2022 00:00	20-Apr-2022 00:00	20-Apr-2022 00:00
Compound	CAS Number	LOR	Unit	ES2213692-001	ES2213692-002	ES2213692-003	ES2213692-004	ES2213692-005
				Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	0.012	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
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	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L	<0.001	0.002	<0.001	0.103	<0.001
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	0.023	<0.005
EG020T: Total Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	0.022	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
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	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L	<0.001	0.002	<0.001	0.112	<0.001
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	0.004	<0.001
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	0.028	<0.005
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW01	MW02	MW03	MW04	MW05
Sampling date / time					20-Apr-2022 00:00	20-Apr-2022 00:00	20-Apr-2022 00:00	20-Apr-2022 00:00	20-Apr-2022 00:00
Compound	CAS Number	LOR	Unit		ES2213692-001	ES2213692-002	ES2213692-003	ES2213692-004	ES2213692-005
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	<100	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L		<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L		<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%		87.1	90.4	89.1	75.8	88.5
Toluene-D8	2037-26-5	2	%		118	130	114	103	112
4-Bromofluorobenzene	460-00-4	2	%		121	128	115	101	116



Analytical Results

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

Sample ID

				MW06	MW07	----	----	----
Sampling date / time				20-Apr-2022 00:00	20-Apr-2022 00:00	----	----	----
Compound	CAS Number	LOR	Unit	ES2213692-006	ES2213692-007	-----	-----	-----
				Result	Result	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	----	----	----
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	----	----	----
Nickel	7440-02-0	0.001	mg/L	0.002	0.001	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	----	----	----
Zinc	7440-66-6	0.005	mg/L	0.008	0.007	----	----	----
EG020T: Total Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	----	----	----
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	----	----	----
Nickel	7440-02-0	0.001	mg/L	0.002	0.001	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	----	----	----
Zinc	7440-66-6	0.005	mg/L	0.009	0.008	----	----	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	----	----	----
EG035T: Total Recoverable 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	<20	----	----	----
C10 - C14 Fraction	----	50	µg/L	<50	<50	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	<100	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	<50	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	----	----	----
>C10 - C16 Fraction	----	100	µg/L	<100	<100	----	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	<100	----	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	<100	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	----	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW06	MW07	----	----	----
Sampling date / time					20-Apr-2022 00:00	20-Apr-2022 00:00	----	----	----
Compound	CAS Number	LOR	Unit		ES2213692-006	ES2213692-007	-----	-----	-----
					Result	Result	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ >C10 - C16 Fraction minus Naphthalene (F2)		----	100	µg/L	<100	<100	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	----	----	----
Toluene	108-88-3	2	µg/L		<2	<2	----	----	----
Ethylbenzene	100-41-4	2	µg/L		<2	<2	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	----	----	----
ortho-Xylene	95-47-6	2	µg/L		<2	<2	----	----	----
^ Total Xylenes		----	2	µg/L	<2	<2	----	----	----
^ Sum of BTEX		----	1	µg/L	<1	<1	----	----	----
Naphthalene		91-20-3	5	µg/L	<5	<5	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%		94.8	87.3	----	----	----
Toluene-D8	2037-26-5	2	%		123	120	----	----	----
4-Bromofluorobenzene	460-00-4	2	%		119	114	----	----	----



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

CERTIFICATE OF ANALYSIS

Work Order : **ES2216156**
Client : **GHD PTY LTD**
Contact : Charlotte George
Address : Level 7 24 Mitchell Street
 DARWIN NT, AUSTRALIA 0800
Telephone : ----
Project : 12526136 Darwin Turf Club Monitoring Event
Order number : ----
C-O-C number : ----
Sampler : Charlotte George
Site : ----
Quote number : SY/090/22 V3
No. of samples received : 9
No. of samples analysed : 9

Page : 1 of 7
Laboratory : Environmental Division Sydney
Contact : Sarah Mathew
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-2-8784 8555
Date Samples Received : 13-May-2022 08:00
Date Analysis Commenced : 17-May-2022
Issue Date : 20-May-2022 15:29



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>
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW



General Comments

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

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

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

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

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

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

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				MW01	MW02	MW03	MW04	MW04 Interlab Duplicate
Sampling date / time				11-May-2022 11:40	11-May-2022 12:30	11-May-2022 11:00	11-May-2022 13:30	11-May-2022 13:30
Compound	CAS Number	LOR	Unit	ES2216156-001	ES2216156-002	ES2216156-003	ES2216156-004	ES2216156-005
				Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	0.014	0.012
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0001	<0.0001	<0.0001
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	0.002	0.003	0.001	<0.001
Nickel	7440-02-0	0.001	mg/L	<0.001	0.002	0.002	0.073	0.068
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.008	0.028	0.023
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW01	MW02	MW03	MW04	MW04 Interlab Duplicate
Sampling date / time					11-May-2022 11:40	11-May-2022 12:30	11-May-2022 11:00	11-May-2022 13:30	11-May-2022 13:30
Compound	CAS Number	LOR	Unit		ES2216156-001	ES2216156-002	ES2216156-003	ES2216156-004	ES2216156-005
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%		107	105	97.8	114	111
Toluene-D8	2037-26-5	2	%		104	102	98.6	112	106
4-Bromofluorobenzene	460-00-4	2	%		104	100	96.3	107	104



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				MW04 Field Duplicate	MW05	MW06	MW07	----
Sampling date / time				11-May-2022 13:30	11-May-2022 13:45	11-May-2022 14:10	11-May-2022 14:50	----
Compound	CAS Number	LOR	Unit	ES2216156-006	ES2216156-007	ES2216156-008	ES2216156-009	-----
				Result	Result	Result	Result	----
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	0.014	<0.001	<0.001	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Copper	7440-50-8	0.001	mg/L	<0.001	0.002	0.002	0.002	----
Nickel	7440-02-0	0.001	mg/L	0.070	<0.001	0.003	<0.001	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Zinc	7440-66-6	0.005	mg/L	0.025	<0.005	0.014	<0.005	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	----
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	----
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	----
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	----
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	----
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	----
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	----
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	----
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	----
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	----
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	----
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	----
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	----



Analytical Results

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

Sample ID

				MW04 Field Duplicate	MW05	MW06	MW07	----
Sampling date / time				11-May-2022 13:30	11-May-2022 13:45	11-May-2022 14:10	11-May-2022 14:50	----
Compound	CAS Number	LOR	Unit	ES2216156-006	ES2216156-007	ES2216156-008	ES2216156-009	-----
				Result	Result	Result	Result	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	114	103	104	102	----
Toluene-D8	2037-26-5	2	%	109	96.7	102	96.6	----
4-Bromofluorobenzene	460-00-4	2	%	107	97.6	100	99.7	----



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

Cleanaway Operations P/L NT
875 Stuart Highway
Holtze
NT 0829

Attention: Mark Anderton

Report 883438-W
Project name DTC PFAS
Received Date Apr 28, 2022

Client Sample ID			G01 PFAS OIL
Sample Matrix			DTC
Eurofins Sample No.			Liquid
Date Sampled			M22-Ap0056687
Test/Reference	LOR	Unit	Apr 28, 2022
Perfluoroalkyl carboxylic acids (PFCAs)			
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	< 100
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	< 100
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	< 100
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.01	ug/L	< 100
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	< 100
Perfluorononanoic acid (PFNA) ^{N11}	0.01	ug/L	< 100
Perfluorodecanoic acid (PFDA) ^{N11}	0.01	ug/L	< 100
Perfluoroundecanoic acid (PFUnDA) ^{N11}	0.01	ug/L	< 100
Perfluorododecanoic acid (PFDoDA) ^{N11}	0.01	ug/L	< 100
Perfluorotridecanoic acid (PFTeDA) ^{N15}	0.01	ug/L	< 100
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	0.01	ug/L	< 100
13C4-PFBA (surr.)	1	%	112
13C5-PFPeA (surr.)	1	%	139
13C5-PFHxA (surr.)	1	%	101
13C4-PFHpA (surr.)	1	%	146
13C8-PFOA (surr.)	1	%	88
13C5-PFNA (surr.)	1	%	108
13C6-PFDA (surr.)	1	%	123
13C2-PFUnDA (surr.)	1	%	132
13C2-PFDoDA (surr.)	1	%	109
13C2-PFTeDA (surr.)	1	%	78
Perfluoroalkyl sulfonamido substances			
Perfluorooctane sulfonamide (FOSA) ^{N11}	0.05	ug/L	< 100
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	0.05	ug/L	< 100
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	0.05	ug/L	< 100
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE) ^{N11}	0.05	ug/L	< 100
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE) ^{N11}	0.05	ug/L	< 100
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	0.05	ug/L	< 100
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	0.05	ug/L	< 100
13C8-FOSA (surr.)	1	%	109
D3-N-MeFOSA (surr.)	1	%	110
D5-N-EtFOSA (surr.)	1	%	111

Client Sample ID			G01 PFAS OIL
Sample Matrix			DTC
Eurofins Sample No.			Liquid
Date Sampled			M22- Ap0056687
Test/Reference	LOR	Unit	Apr 28, 2022
Perfluoroalkyl sulfonamido substances			
D7-N-MeFOSE (surr.)	1	%	116
D9-N-EtFOSE (surr.)	1	%	118
D5-N-EtFOSAA (surr.)	1	%	100
D3-N-MeFOSAA (surr.)	1	%	112
Perfluoroalkyl sulfonic acids (PFASs)			
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	< 100
Perfluorononanesulfonic acid (PFNS) ^{N15}	0.01	ug/L	< 100
Perfluoropropanesulfonic acid (PFPrS) ^{N15}	0.01	ug/L	< 100
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.01	ug/L	< 100
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	< 100
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	< 100
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	< 100
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 100
13C3-PFBS (surr.)	1	%	95
18O2-PFHxS (surr.)	1	%	105
13C8-PFOS (surr.)	1	%	110
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	0.01	ug/L	< 100
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA) ^{N11}	0.05	ug/L	< 100
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	0.01	ug/L	< 100
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	0.01	ug/L	< 100
13C2-4:2 FTSA (surr.)	1	%	125
13C2-6:2 FTSA (surr.)	1	%	164
13C2-8:2 FTSA (surr.)	1	%	169
13C2-10:2 FTSA (surr.)	1	%	101
PFASs Summations			
Sum (PFHxS + PFOS)*	0.01	ug/L	< 100
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	< 100
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	< 100
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	< 100
Sum of PFASs (n=30)*	0.1	ug/L	< 100

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
Per- and Polyfluoroalkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs)	Brisbane	Apr 29, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Brisbane	Apr 29, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAs)	Brisbane	Apr 29, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Brisbane	Apr 29, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

Company Name: Cleanaway Operations P/L NT
Address: 875 Stuart Highway
Holtze
NT 0829
Project Name: DTC PFAS

Order No.:
Report #: 883438
Phone: 08 8935 1104
Fax: 08 8932 5888

Received: Apr 28, 2022 12:45 PM
Due: Apr 29, 2022
Priority: 1 Day
Contact Name: Mark Anderton

Eurofins Analytical Services Manager : Michael Morrison

Sample Detail						Per- and Polyfluoroalkyl Substances (PFASs) - TOPA
Melbourne Laboratory - NATA # 1261 Site # 1254						
Sydney Laboratory - NATA # 1261 Site # 18217						
Brisbane Laboratory - NATA # 1261 Site # 20794						X
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	PFAS OIL DTC	Apr 28, 2022		Liquid	M22- Ap0056687	X
Test Counts						1

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	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

- 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	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
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
Jonathon Angell 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](#).

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

CERTIFICATE OF ANALYSIS

Work Order : **ES2213685**
Client : **GHD PTY LTD**
Contact : Charlotte George
Address : Level 7 24 Mitchell Street
 DARWIN NT, AUSTRALIA 0800
Telephone : ----
Project : 12526136 Darwin Turf Club Monitoring Event
Order number : ----
C-O-C number : ----
Sampler : Charlotte George
Site : ----
Quote number : SY/090/22 V3
No. of samples received : 3
No. of samples analysed : 3

Page : 1 of 4
Laboratory : Environmental Division Sydney
Contact : Sarah Mathew
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-2-8784 8555
Date Samples Received : 21-Apr-2022 07:30
Date Analysis Commenced : 26-Apr-2022
Issue Date : 27-Apr-2022 12:41



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>
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, 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.

- ALS is not NATA accredited for the analysis of SVOC in oil matrix.
- EP075: Particular samples required dilution due to sample matrix . LOR values have been adjusted accordingly.
- EP066 : Particular samples required dilution due to sample matrix . LOR values have been adjusted accordingly.
- EP075: Where reported, 'Sum of PAH' is the sum of the USEPA 16 priority PAHs
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) 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), Dibenzo(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR.
Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.



Analytical Results

Sub-Matrix: OIL (Matrix: SOIL)				Sample ID	Oil - 01	Oil - 02	Oil - 03	----	----
Sampling date / time					20-Apr-2022 00:00	20-Apr-2022 00:00	20-Apr-2022 00:00	----	----
Compound	CAS Number	LOR	Unit		ES2213685-001	ES2213685-002	ES2213685-003	-----	-----
					Result	Result	Result	----	----
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		<0.2	<0.2	<0.2	----	----
EP075G: Chlorinated Hydrocarbons									
1,3-Dichlorobenzene	541-73-1	0.5	mg/kg		<30.0	<30.0	<30.0	----	----
1,4-Dichlorobenzene	106-46-7	0.5	mg/kg		<30.0	<30.0	<30.0	----	----
1,2-Dichlorobenzene	95-50-1	0.5	mg/kg		<30.0	<30.0	<30.0	----	----
Hexachloroethane	67-72-1	0.5	mg/kg		<30.0	<30.0	<30.0	----	----
1,2,4-Trichlorobenzene	120-82-1	0.5	mg/kg		<30.0	<30.0	<30.0	----	----
Hexachloropropylene	1888-71-7	0.5	mg/kg		<30.0	<30.0	<30.0	----	----
Hexachlorobutadiene	87-68-3	0.5	mg/kg		<30.0	<30.0	<30.0	----	----
Hexachlorocyclopentadiene	77-47-4	2.5	mg/kg		<30.0	<30.0	<30.0	----	----
Pentachlorobenzene	608-93-5	0.5	mg/kg		<30.0	<30.0	<30.0	----	----
Hexachlorobenzene (HCB)	118-74-1	1.0	mg/kg		<30.0	<30.0	<30.0	----	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		68.3	71.2	78.3	----	----
EP075S: Acid Extractable Surrogates									
2-Fluorophenol	367-12-4	0.5	%		93.7	90.3	86.7	----	----
Phenol-d6	13127-88-3	0.5	%		79.7	82.4	76.9	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		85.5	86.7	80.2	----	----
2,4,6-Tribromophenol	118-79-6	0.5	%		83.8	85.4	75.6	----	----
EP075T: Base/Neutral Extractable Surrogates									
Nitrobenzene-D5	4165-60-0	0.5	%		92.6	94.2	92.5	----	----
1,2-Dichlorobenzene-D4	2199-69-1	0.5	%		82.2	81.4	79.0	----	----
2-Fluorobiphenyl	321-60-8	0.5	%		93.8	89.7	88.1	----	----
Anthracene-d10	1719-06-8	0.5	%		88.8	85.8	82.8	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		79.7	77.3	72.3	----	----



Surrogate Control Limits

Sub-Matrix: OIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	39	149
EP075S: Acid Extractable Surrogates			
2-Fluorophenol	367-12-4	29	149
Phenol-d6	13127-88-3	32	128
2-Chlorophenol-D4	93951-73-6	32	128
2,4,6-Tribromophenol	118-79-6	13	121
EP075T: Base/Neutral Extractable Surrogates			
Nitrobenzene-D5	4165-60-0	33	125
1,2-Dichlorobenzene-D4	2199-69-1	34	108
2-Fluorobiphenyl	321-60-8	35	121
Anthracene-d10	1719-06-8	35	123
4-Terphenyl-d14	1718-51-0	33	125

Eurofins | mgt - QLD
1/21 Smallwood Place
Murarie
QLD 4712



NATA Accredited
Accreditation Number 1261
Site Number 20794

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: **Canister Certification Report**

Report **876359-TO**

Project name **CANISTER CERTIFICATION REPORT - APRIL**

Received Date **Apr 01, 2022**

Client Sample ID			6L0031	6L0004	6L0046
Sample Matrix			6L Passivated Canister	6L Passivated Canister	6L Passivated Canister
Eurofins Sample No.			T22-Ap0044949	T22-Ap0044951	T22-Ap0044953
Date Sampled			Apr 19, 2022	Apr 19, 2022	Apr 20, 2022
Receipt Vac./Pressure (inHg)					
Final Pressure (psi)					
Test/Reference	LOR	Unit			
Dilution Factor	0.1		1.0	1.0	1.0
US EPA Compendium Methods TO-15					
1.1-Dichloroethane	2	ug/m3	< 2	< 2	< 2
1.1-Dichloroethene	2	ug/m3	< 2	< 2	< 2
1.1.1-Trichloroethane	2.7	ug/m3	< 2.7	< 2.7	< 2.7
1.1.2-Trichloroethane	2.7	ug/m3	< 2.7	< 2.7	< 2.7
1.1.2.2-Tetrachloroethane	3.4	ug/m3	< 3.4	< 3.4	< 3.4
1.2-Dibromoethane (EDB)	3.6	ug/m3	< 3.6	< 3.6	< 3.6
1.2-Dichlorobenzene	3	ug/m3	< 3	< 3	< 3
1.2-Dichloroethane	2	ug/m3	< 2	< 2	< 2
1.2-Dichloropropane	2.3	ug/m3	< 2.3	< 2.3	< 2.3
1.2.4-Trichlorobenzene	15	ug/m3	< 15	< 15	< 15
1.2.4-Trimethylbenzene	2.5	ug/m3	< 2.5	< 2.5	< 2.5
1.3-Butadiene	2.2	ug/m3	< 2.2	< 2.2	< 2.2
1.3-Dichlorobenzene	3	ug/m3	< 3	< 3	< 3
1.3.5-Trimethylbenzene	2.5	ug/m3	< 2.5	< 2.5	< 2.5
1.4-Dichlorobenzene	3	ug/m3	< 3	< 3	< 3
1.4-Dioxane	7.2	ug/m3	< 7.2	< 7.2	< 7.2
2-Butanone (Methyl Ethyl Ketone)	5.9	ug/m3	< 5.9	< 5.9	< 5.9
2-Hexanone	8.2	ug/m3	< 8.2	< 8.2	< 8.2
2.2.4-Trimethylpentane	9.3	ug/m3	< 9.3	< 9.3	< 9.3
3-Chloropropene	1.6	ug/m3	< 1.6	< 1.6	< 1.6
4-Ethyltoluene	2.5	ug/m3	< 2.5	< 2.5	< 2.5
4-Methyl-2-Pentanone (MIBK)	2.1	ug/m3	< 2.1	< 2.1	< 2.1
Acetone	16.6	ug/m3	< 16.6	< 16.6	< 16.6
Benzene	1.6	ug/m3	< 1.6	< 1.6	< 1.6
Bromodichloromethane	3.4	ug/m3	< 3.4	< 3.4	< 3.4
Bromoform	5.2	ug/m3	< 5.2	< 5.2	< 5.2
Bromomethane	19.4	ug/m3	< 19.4	< 19.4	< 19.4
Carbon Disulfide	15.6	ug/m3	< 15.6	< 15.6	< 15.6
Carbon Tetrachloride	3.1	ug/m3	< 3.1	< 3.1	< 3.1
Chlorobenzene	2.3	ug/m3	< 2.3	< 2.3	< 2.3
Chloroethane	5.3	ug/m3	< 5.3	< 5.3	< 5.3

Client Sample ID			6L0031	6L0004	6L0046
Sample Matrix			6L Passivated Canister	6L Passivated Canister	6L Passivated Canister
Eurofins Sample No.			T22-Ap0044949	T22-Ap0044951	T22-Ap0044953
Date Sampled			Apr 19, 2022	Apr 19, 2022	Apr 20, 2022
Receipt Vac./Pressure (inHg)					
Final Pressure (psi)					
Test/Reference	LOR	Unit			
US EPA Compendium Methods TO-15					
Chloroform	2.4	ug/m3	< 2.4	< 2.4	< 2.4
Chloromethane	10.3	ug/m3	< 10.3	< 10.3	< 10.3
Chlorotoluene (Benzyl Chloride)	2.6	ug/m3	< 2.6	< 2.6	< 2.6
cis-1.2-Dichloroethene	2	ug/m3	< 2	< 2	< 2
cis-1.3-Dichloropropene	2.3	ug/m3	< 2.3	< 2.3	< 2.3
Cyclohexane	3.5	ug/m3	< 3.5	< 3.5	< 3.5
Dibromochloromethane	4.3	ug/m3	< 4.3	< 4.3	< 4.3
Methylene Chloride	17.4	ug/m3	< 17.4	< 17.4	< 17.4
Ethanol	9.4	ug/m3	< 9.4	< 9.4	< 9.4
Ethylbenzene	2.2	ug/m3	< 2.2	< 2.2	< 2.2
Freon 11 (Trichlorofluoromethane)	2.8	ug/m3	< 2.8	< 2.8	< 2.8
Freon 113 (Trichlorotrifluoroethane)	3.8	ug/m3	< 3.8	< 3.8	< 3.8
Freon 114	3.5	ug/m3	< 3.5	< 3.5	< 3.5
Freon 12 (Dichlorodifluoromethane)	2.5	ug/m3	< 2.5	< 2.5	< 2.5
Heptane	2.1	ug/m3	< 2.1	< 2.1	< 2.1
Hexachlorobutadiene	21.3	ug/m3	< 21.3	< 21.3	< 21.3
Hexane	5	ug/m3	< 5	< 5	< 5
Isopropanol	50	ug/m3	< 50	< 50	< 50
m,p-Xylene	4.4	ug/m3	< 4.4	< 4.4	< 4.4
Xylenes - Total*	6.6	ug/m3	< 6.6	< 6.6	< 6.6
Methyl t-Butyl Ether (MTBE)	7.2	ug/m3	< 7.2	< 7.2	< 7.2
Naphthalene	10.5	ug/m3	< 10.5	< 10.5	< 10.5
o-Xylene	2.2	ug/m3	< 2.2	< 2.2	< 2.2
Propylene	8.6	ug/m3	< 8.6	< 8.6	< 8.6
Styrene	2.1	ug/m3	< 2.1	< 2.1	< 2.1
Tetrachloroethene	3.4	ug/m3	< 3.4	< 3.4	< 3.4
Tetrahydrofuran	1.5	ug/m3	< 1.5	< 1.5	< 1.5
Toluene	7.5	ug/m3	< 7.5	< 7.5	< 7.5
trans-1.2-Dichloroethene	2	ug/m3	< 2	< 2	< 2
trans-1.3-Dichloropropene	2.3	ug/m3	< 2.3	< 2.3	< 2.3
Trichloroethene	2.7	ug/m3	< 2.7	< 2.7	< 2.7
Vinyl Acetate	7.0	ug/m3	< 7	< 7	< 7
Vinyl Chloride	2.5	ug/m3	< 2.5	< 2.5	< 2.5
4-Bromofluorobenzene (surr.)	1	%	98	98	115

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

US EPA Compendium Methods TO-15

Testing Site

BrisbaneAir

Extracted

Apr 22, 2022

Holding Time

30 Days

- Method: SOP #6 Analysis of Volatile Organic Compounds in Passivated Canisters EPA Method TO-15 And Modified EPA Method TO-14A

Company Name:	Eurofins mgt - QLD	Order No.:		Received:	Apr 1, 2022 12:00 AM
Address:	1/21 Smallwood Place Murarrie QLD 4712	Report #:	876359	Due:	Jul 21, 2022
		Phone:	07 3902 4600	Priority:	60 Day
		Fax:		Contact Name:	Canister Certification Report
Project Name:	CANISTER CERTIFICATION REPORT - APRIL				
Eurofins Analytical Services Manager : Ryan Gilbert					

Sample Detail						Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	US EPA Compendium Methods TO-15
Melbourne Laboratory - NATA # 1261 Site # 1254									
Sydney Laboratory - NATA # 1261 Site # 18217									
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X	X
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	DUMMY	Not Provided		1L Passivated Canister	T22-Ap0000495				X
2	1L0060	Apr 01, 2022		1L Passivated Canister	T22-Ap0022338	X	X	X	X
3	6L0033	Apr 01, 2022		6L Passivated Canister	T22-Ap0022339	X	X	X	X
4	1L0129	Apr 01, 2022		1L Passivated Canister	T22-Ap0022340	X	X	X	X
5	1L0143	Apr 01, 2022		1L Passivated Canister	T22-Ap0022341	X	X	X	X
6	1L0212	Apr 01, 2022		1L Passivated Canister	T22-Ap0022342	X	X	X	X

Company Name: Eurofins | mgt - QLD
Address: 1/21 Smallwood Place
Murarrie
QLD 4712

Project Name: CANISTER CERTIFICATION REPORT - APRIL

Order No.:
Report #: 876359
Phone: 07 3902 4600
Fax:

Received: Apr 1, 2022 12:00 AM
Due: Jul 21, 2022
Priority: 60 Day
Contact Name: Canister Certification Report

Eurofins Analytical Services Manager : Ryan Gilbert

Sample Detail						Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	US EPA Compendium Methods TO-15
Melbourne Laboratory - NATA # 1261 Site # 1254									
Sydney Laboratory - NATA # 1261 Site # 18217									
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X	X
Mayfield Laboratory - NATA # 1261 Site # 25079									
Perth Laboratory - NATA # 2377 Site # 2370									
External Laboratory									
7	1L0203	Apr 01, 2022		1L Passivated Canister	T22-Ap0022343	X	X	X	X
8	1L0181	Apr 01, 2022		1L Passivated Canister	T22-Ap0022344	X	X	X	X
9	1L0064	Apr 01, 2022		1L Passivated Canister	T22-Ap0022345	X	X	X	X
10	1L0110	Apr 01, 2022		1L Passivated Canister	T22-Ap0022346	X	X	X	X
11	1L0063	Apr 01, 2022		1L Passivated Canister	T22-Ap0022347	X	X	X	X
12	1L0023	Apr 01, 2022		1L Passivated Canister	T22-Ap0022348	X	X	X	X
13	1L0168	Apr 01, 2022		1L Passivated Canister	T22-Ap0022349	X	X	X	X

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		Phone:	07 3902 4600	Priority:	60 Day
		Fax:		Contact Name:	Canister Certification Report
Project Name:	CANISTER CERTIFICATION REPORT - APRIL				
Eurofins Analytical Services Manager : Ryan Gilbert					

Sample Detail						Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	US EPA Compendium Methods TO-15
Melbourne Laboratory - NATA # 1261 Site # 1254									
Sydney Laboratory - NATA # 1261 Site # 18217									
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X	X
Mayfield Laboratory - NATA # 1261 Site # 25079									
Perth Laboratory - NATA # 2377 Site # 2370									
External Laboratory									
14	1L0226	Apr 03, 2022		1L Passivated Canister	T22-Ap0022350	X	X	X	X
15	1L0159	Apr 03, 2022		1L Passivated Canister	T22-Ap0022351	X	X	X	X
16	1L0002	Apr 03, 2022		1L Passivated Canister	T22-Ap0022352	X	X	X	X
17	1L0191	Apr 03, 2022		1L Passivated Canister	T22-Ap0022353	X	X	X	X
18	1L0198	Apr 03, 2022		1L Passivated Canister	T22-Ap0022354	X	X	X	X
19	1L0012	Apr 03, 2022		1L Passivated Canister	T22-Ap0022355	X	X	X	X
20	1L0103	Apr 03, 2022		1L Passivated Canister	T22-Ap0022356	X	X	X	X

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		Phone:	07 3902 4600	Priority:	60 Day
		Fax:		Contact Name:	Canister Certification Report
Project Name:	CANISTER CERTIFICATION REPORT - APRIL				
Eurofins Analytical Services Manager : Ryan Gilbert					

Sample Detail						Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	US EPA Compendium Methods TO-15
Melbourne Laboratory - NATA # 1261 Site # 1254									
Sydney Laboratory - NATA # 1261 Site # 18217									
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X	X
Mayfield Laboratory - NATA # 1261 Site # 25079									
Perth Laboratory - NATA # 2377 Site # 2370									
External Laboratory									
21	1L0177	Apr 03, 2022		1L Passivated Canister	T22-Ap0022357	X	X	X	X
22	1L0193	Apr 03, 2022		1L Passivated Canister	T22-Ap0022358	X	X	X	X
23	1L0046	Apr 03, 2022		1L Passivated Canister	T22-Ap0022359	X	X	X	X
24	1L2974	Apr 03, 2022		1L Passivated Canister	T22-Ap0022360	X	X	X	X
25	1L0146	Apr 03, 2022		1L Passivated Canister	T22-Ap0022361	X	X	X	X
26	1L0054	Apr 03, 2022		1L Passivated Canister	T22-Ap0022362	X	X	X	X
27	1L0153	Apr 03, 2022		1L Passivated Canister	T22-Ap0022363	X	X	X	X

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		Phone:	07 3902 4600	Priority:	60 Day
		Fax:		Contact Name:	Canister Certification Report
Project Name:	CANISTER CERTIFICATION REPORT - APRIL				
Eurofins Analytical Services Manager : Ryan Gilbert					

Sample Detail						Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	US EPA Compendium Methods TO-15
Melbourne Laboratory - NATA # 1261 Site # 1254									
Sydney Laboratory - NATA # 1261 Site # 18217									
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X	X
Mayfield Laboratory - NATA # 1261 Site # 25079									
Perth Laboratory - NATA # 2377 Site # 2370									
External Laboratory									
28	1L0078	Apr 03, 2022		1L Passivated Canister	T22-Ap0022364	X	X	X	X
29	1L0156	Apr 03, 2022		1L Passivated Canister	T22-Ap0022365	X	X	X	X
30	1L0034	Apr 03, 2022		1L Passivated Canister	T22-Ap0022366	X	X	X	X
31	1L0115	Apr 03, 2022		1L Passivated Canister	T22-Ap0022367	X	X	X	X
32	1L0241	Apr 03, 2022		1L Passivated Canister	T22-Ap0022368	X	X	X	X
33	1L0120	Apr 03, 2022		1L Passivated Canister	T22-Ap0022369	X	X	X	X
34	1L0036	Apr 03, 2022		1L Passivated Canister	T22-Ap0022370	X	X	X	X

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		Phone:	07 3902 4600	Priority:	60 Day
		Fax:		Contact Name:	Canister Certification Report
Project Name:	CANISTER CERTIFICATION REPORT - APRIL				
Eurofins Analytical Services Manager : Ryan Gilbert					

Sample Detail						Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	US EPA Compendium Methods TO-15
Melbourne Laboratory - NATA # 1261 Site # 1254									
Sydney Laboratory - NATA # 1261 Site # 18217									
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X	X
Mayfield Laboratory - NATA # 1261 Site # 25079									
Perth Laboratory - NATA # 2377 Site # 2370									
External Laboratory									
35	1L0075	Apr 03, 2022		1L Passivated Canister	T22-Ap0022371	X	X	X	X
36	1L0038	Apr 03, 2022		1L Passivated Canister	T22-Ap0022372	X	X	X	X
37	1L0169	Apr 04, 2022		1L Passivated Canister	T22-Ap0022373	X	X	X	X
38	1L0124	Apr 04, 2022		1L Passivated Canister	T22-Ap0022374	X	X	X	X
39	1L0005	Apr 04, 2022		1L Passivated Canister	T22-Ap0022375	X	X	X	X
40	1L0223	Apr 04, 2022		1L Passivated Canister	T22-Ap0022376	X	X	X	X
41	1L0006	Apr 04, 2022		1L Passivated Canister	T22-Ap0022377	X	X	X	X

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		Phone:	07 3902 4600	Priority:	60 Day
		Fax:		Contact Name:	Canister Certification Report
Project Name:	CANISTER CERTIFICATION REPORT - APRIL				

Eurofins Analytical Services Manager : Ryan Gilbert

Sample Detail						Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	US EPA Compendium Methods TO-15
Melbourne Laboratory - NATA # 1261 Site # 1254									
Sydney Laboratory - NATA # 1261 Site # 18217									
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X	X
Mayfield Laboratory - NATA # 1261 Site # 25079									
Perth Laboratory - NATA # 2377 Site # 2370									
External Laboratory									
42	1L0162	Apr 05, 2022		1L Passivated Canister	T22-Ap0022378	X	X	X	X
43	1L0230	Apr 05, 2022		1L Passivated Canister	T22-Ap0022379	X	X	X	X
44	1L0170	Apr 05, 2022		1L Passivated Canister	T22-Ap0022380	X	X	X	X
45	1L0121	Apr 05, 2022		1L Passivated Canister	T22-Ap0022381	X	X	X	X
46	1L0020	Apr 06, 2022		1L Passivated Canister	T22-Ap0022382	X	X	X	X
47	1L0228	Apr 06, 2022		1L Passivated Canister	T22-Ap0022383	X	X	X	X
48	1L0196	Apr 06, 2022		1L Passivated Canister	T22-Ap0022384	X	X	X	X

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		Phone:	07 3902 4600	Priority:	60 Day
		Fax:		Contact Name:	Canister Certification Report
Project Name:	CANISTER CERTIFICATION REPORT - APRIL				
Eurofins Analytical Services Manager : Ryan Gilbert					

Sample Detail						Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	US EPA Compendium Methods TO-15
Melbourne Laboratory - NATA # 1261 Site # 1254									
Sydney Laboratory - NATA # 1261 Site # 18217									
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X	X
Mayfield Laboratory - NATA # 1261 Site # 25079									
Perth Laboratory - NATA # 2377 Site # 2370									
External Laboratory									
49	1L0003	Apr 06, 2022		1L Passivated Canister	T22-Ap0022385	X	X	X	X
50	1L0042	Apr 06, 2022		1L Passivated Canister	T22-Ap0022386	X	X	X	X
51	1L0093	Apr 06, 2022		1L Passivated Canister	T22-Ap0022387	X	X	X	X
52	1L0056	Apr 06, 2022		1L Passivated Canister	T22-Ap0022388	X	X	X	X
53	1L0059	Apr 06, 2022		1L Passivated Canister	T22-Ap0022389	X	X	X	X
54	1L0080	Apr 06, 2022		1L Passivated Canister	T22-Ap0022390	X	X	X	X
55	1L0249	Apr 06, 2022		1L Passivated Canister	T22-Ap0022391	X	X	X	X

Company Name:	Eurofins mgt - QLD	Order No.:		Received:	Apr 1, 2022 12:00 AM
Address:	1/21 Smallwood Place Murarrie QLD 4712	Report #:	876359	Due:	Jul 21, 2022
		Phone:	07 3902 4600	Priority:	60 Day
		Fax:		Contact Name:	Canister Certification Report
Project Name:	CANISTER CERTIFICATION REPORT - APRIL				

Eurofins Analytical Services Manager : Ryan Gilbert

Sample Detail						Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	US EPA Compendium Methods TO-15
Melbourne Laboratory - NATA # 1261 Site # 1254									
Sydney Laboratory - NATA # 1261 Site # 18217									
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X	X
Mayfield Laboratory - NATA # 1261 Site # 25079									
Perth Laboratory - NATA # 2377 Site # 2370									
External Laboratory									
56	1L0058	Apr 07, 2022		1L Passivated Canister	T22-Ap0022392	X	X	X	X
57	1L0117	Apr 07, 2022		1L Passivated Canister	T22-Ap0022393	X	X	X	X
58	1L0207	Apr 07, 2022		1L Passivated Canister	T22-Ap0022394	X	X	X	X
59	1L0215	Apr 07, 2022		1L Passivated Canister	T22-Ap0022395	X	X	X	X
60	1L0031	Apr 07, 2022		1L Passivated Canister	T22-Ap0022396	X	X	X	X
61	1L0147	Apr 07, 2022		1L Passivated Canister	T22-Ap0022397	X	X	X	X
62	1L0104	Apr 07, 2022		1L Passivated Canister	T22-Ap0022398	X	X	X	X

Company Name:	Eurofins mgt - QLD	Order No.:		Received:	Apr 1, 2022 12:00 AM
Address:	1/21 Smallwood Place Murarrie QLD 4712	Report #:	876359	Due:	Jul 21, 2022
		Phone:	07 3902 4600	Priority:	60 Day
		Fax:		Contact Name:	Canister Certification Report
Project Name:	CANISTER CERTIFICATION REPORT - APRIL				

Eurofins Analytical Services Manager : Ryan Gilbert

Sample Detail						Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	US EPA Compendium Methods TO-15
Melbourne Laboratory - NATA # 1261 Site # 1254									
Sydney Laboratory - NATA # 1261 Site # 18217									
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X	X
Mayfield Laboratory - NATA # 1261 Site # 25079									
Perth Laboratory - NATA # 2377 Site # 2370									
External Laboratory									
63	1L0130	Apr 07, 2022		1L Passivated Canister	T22-Ap0022399	X	X	X	X
64	1L0197	Apr 07, 2022		1L Passivated Canister	T22-Ap0022400	X	X	X	X
65	1L0017	Apr 07, 2022		1L Passivated Canister	T22-Ap0022401	X	X	X	X
66	1L0151	Apr 07, 2022		1L Passivated Canister	T22-Ap0022402	X	X	X	X
67	1L0030	Apr 07, 2022		1L Passivated Canister	T22-Ap0022403	X	X	X	X
68	1L0227	Apr 08, 2022		1L Passivated Canister	T22-Ap0022404	X	X	X	X
69	1L0010	Apr 08, 2022		1L Passivated Canister	T22-Ap0022405	X	X	X	X

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		Phone:	07 3902 4600	Priority:	60 Day
		Fax:		Contact Name:	Canister Certification Report
Project Name:	CANISTER CERTIFICATION REPORT - APRIL				
Eurofins Analytical Services Manager : Ryan Gilbert					

Sample Detail						Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	US EPA Compendium Methods TO-15
Melbourne Laboratory - NATA # 1261 Site # 1254									
Sydney Laboratory - NATA # 1261 Site # 18217									
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X	X
Mayfield Laboratory - NATA # 1261 Site # 25079									
Perth Laboratory - NATA # 2377 Site # 2370									
External Laboratory									
70	1L0180	Apr 08, 2022		1L Passivated Canister	T22-Ap0022406	X	X	X	X
71	1L0189	Apr 08, 2022		1L Passivated Canister	T22-Ap0022407	X	X	X	X
72	1L0015	Apr 08, 2022		1L Passivated Canister	T22-Ap0022408	X	X	X	X
73	1L0014	Apr 08, 2022		1L Passivated Canister	T22-Ap0022409	X	X	X	X
74	1L0011	Apr 08, 2022		1L Passivated Canister	T22-Ap0022410	X	X	X	X
75	1L0136	Apr 08, 2022		1L Passivated Canister	T22-Ap0022411	X	X	X	X
76	1L0232	Apr 08, 2022		1L Passivated Canister	T22-Ap0022412	X	X	X	X

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Sample Detail						Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	US EPA Compendium Methods TO-15
Melbourne Laboratory - NATA # 1261 Site # 1254									
Sydney Laboratory - NATA # 1261 Site # 18217									
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X	X
Mayfield Laboratory - NATA # 1261 Site # 25079									
Perth Laboratory - NATA # 2377 Site # 2370									
External Laboratory									
77	1L0102	Apr 08, 2022		1L Passivated Canister	T22-Ap0022413	X	X	X	X
78	1L0108	Apr 08, 2022		1L Passivated Canister	T22-Ap0022414	X	X	X	X
79	1L0172	Apr 11, 2022		1L Passivated Canister	T22-Ap0022415	X	X	X	X
80	1L0192	Apr 11, 2022		1L Passivated Canister	T22-Ap0044885	X	X	X	X
81	1L0231	Apr 11, 2022		1L Passivated Canister	T22-Ap0044886	X	X	X	X
82	1L0145	Apr 11, 2022		1L Passivated Canister	T22-Ap0044887	X	X	X	X
83	1L0211	Apr 11, 2022		1L Passivated Canister	T22-Ap0044888	X	X	X	X

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Sample Detail						Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	US EPA Compendium Methods TO-15
Melbourne Laboratory - NATA # 1261 Site # 1254									
Sydney Laboratory - NATA # 1261 Site # 18217									
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X	X
Mayfield Laboratory - NATA # 1261 Site # 25079									
Perth Laboratory - NATA # 2377 Site # 2370									
External Laboratory									
84	1L0186	Apr 11, 2022		1L Passivated Canister	T22-Ap0044889	X	X	X	X
85	1L0240	Apr 11, 2022		1L Passivated Canister	T22-Ap0044890	X	X	X	X
86	1L0155	Apr 11, 2022		1L Passivated Canister	T22-Ap0044891	X	X	X	X
87	1L0051	Apr 11, 2022		1L Passivated Canister	T22-Ap0044892	X	X	X	X
88	1L0152	Apr 11, 2022		1L Passivated Canister	T22-Ap0044893	X	X	X	X
89	1L0041	Apr 11, 2022		1L Passivated Canister	T22-Ap0044894	X	X	X	X
90	1L0087	Apr 11, 2022		1L Passivated Canister	T22-Ap0044895	X	X	X	X

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Sample Detail						Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	US EPA Compendium Methods TO-15
Melbourne Laboratory - NATA # 1261 Site # 1254									
Sydney Laboratory - NATA # 1261 Site # 18217									
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X	X
Mayfield Laboratory - NATA # 1261 Site # 25079									
Perth Laboratory - NATA # 2377 Site # 2370									
External Laboratory									
91	1L0229	Apr 11, 2022		1L Passivated Canister	T22-Ap0044896	X	X	X	X
92	1L0216	Apr 13, 2022		1L Passivated Canister	T22-Ap0044897	X	X	X	X
93	1L0097	Apr 13, 2022		1L Passivated Canister	T22-Ap0044898	X	X	X	X
94	1L0205	Apr 13, 2022		1L Passivated Canister	T22-Ap0044899	X	X	X	X
95	1L0052	Apr 13, 2022		1L Passivated Canister	T22-Ap0044900	X	X	X	X
96	1L0090	Apr 13, 2022		1L Passivated Canister	T22-Ap0044901	X	X	X	X
97	1L0009	Apr 13, 2022		1L Passivated Canister	T22-Ap0044902	X	X	X	X

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Sample Detail						Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	US EPA Compendium Methods TO-15
Melbourne Laboratory - NATA # 1261 Site # 1254									
Sydney Laboratory - NATA # 1261 Site # 18217									
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X	X
Mayfield Laboratory - NATA # 1261 Site # 25079									
Perth Laboratory - NATA # 2377 Site # 2370									
External Laboratory									
98	1L0035	Apr 13, 2022		1L Passivated Canister	T22-Ap0044903	X	X	X	X
99	1L0192	Apr 13, 2022		1L Passivated Canister	T22-Ap0044904	X	X	X	X
100	1L0040	Apr 13, 2022		1L Passivated Canister	T22-Ap0044905	X	X	X	X
101	1L0112	Apr 13, 2022		1L Passivated Canister	T22-Ap0044906	X	X	X	X
102	1L0011	Apr 13, 2022		1L Passivated Canister	T22-Ap0044907	X	X	X	X
103	1L2707	Apr 13, 2022		1L Passivated Canister	T22-Ap0044908	X	X	X	X
104	6L0042	Apr 13, 2022		6L Passivated Canister	T22-Ap0044909	X	X	X	X

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Sample Detail						Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	US EPA Compendium Methods TO-15
Melbourne Laboratory - NATA # 1261 Site # 1254									
Sydney Laboratory - NATA # 1261 Site # 18217									
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X	X
Mayfield Laboratory - NATA # 1261 Site # 25079									
Perth Laboratory - NATA # 2377 Site # 2370									
External Laboratory									
105	6L0068	Apr 13, 2022		6L Passivated Canister	T22-Ap0044910	X	X	X	X
106	6L0034	Apr 13, 2022		6L Passivated Canister	T22-Ap0044911	X	X	X	X
107	6L0002	Apr 13, 2022		6L Passivated Canister	T22-Ap0044912	X	X	X	X
108	1L0209	Apr 13, 2022		1L Passivated Canister	T22-Ap0044913	X	X	X	X
109	1L0028	Apr 13, 2022		1L Passivated Canister	T22-Ap0044914	X	X	X	X
110	1L0137	Apr 13, 2022		1L Passivated Canister	T22-Ap0044915	X	X	X	X
111	1L0224	Apr 13, 2022		1L Passivated Canister	T22-Ap0044916	X	X	X	X

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Sample Detail						Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	US EPA Compendium Methods TO-15
Melbourne Laboratory - NATA # 1261 Site # 1254									
Sydney Laboratory - NATA # 1261 Site # 18217									
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X	X
Mayfield Laboratory - NATA # 1261 Site # 25079									
Perth Laboratory - NATA # 2377 Site # 2370									
External Laboratory									
112	1L0082	Apr 13, 2022		1L Passivated Canister	T22-Ap0044917	X	X	X	X
113	1L0111	Apr 13, 2022		1L Passivated Canister	T22-Ap0044918	X	X	X	X
114	1L0165	Apr 13, 2022		1L Passivated Canister	T22-Ap0044919	X	X	X	X
115	1L0179	Apr 13, 2022		1L Passivated Canister	T22-Ap0044920	X	X	X	X
116	1L0194	Apr 13, 2022		1L Passivated Canister	T22-Ap0044921	X	X	X	X
117	1L0175	Apr 13, 2022		1L Passivated Canister	T22-Ap0044922	X	X	X	X
118	1L0199	Apr 13, 2022		1L Passivated Canister	T22-Ap0044923	X	X	X	X

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Sample Detail						Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	US EPA Compendium Methods TO-15
Melbourne Laboratory - NATA # 1261 Site # 1254									
Sydney Laboratory - NATA # 1261 Site # 18217									
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X	X
Mayfield Laboratory - NATA # 1261 Site # 25079									
Perth Laboratory - NATA # 2377 Site # 2370									
External Laboratory									
119	1L0116	Apr 14, 2022		1L Passivated Canister	T22-Ap0044924	X	X	X	X
120	1L0219	Apr 14, 2022		1L Passivated Canister	T22-Ap0044925	X	X	X	X
121	1L0238	Apr 14, 2022		1L Passivated Canister	T22-Ap0044926	X	X	X	X
122	1L0032	Apr 14, 2022		1L Passivated Canister	T22-Ap0044927	X	X	X	X
123	1L0142	Apr 14, 2022		1L Passivated Canister	T22-Ap0044928	X	X	X	X
124	1L0044	Apr 14, 2022		1L Passivated Canister	T22-Ap0044929	X	X	X	X
125	1L0098	Apr 14, 2022		1L Passivated Canister	T22-Ap0044930	X	X	X	X

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Eurofins Analytical Services Manager : Ryan Gilbert					

Sample Detail						Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	US EPA Compendium Methods TO-15
Melbourne Laboratory - NATA # 1261 Site # 1254									
Sydney Laboratory - NATA # 1261 Site # 18217									
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X	X
Mayfield Laboratory - NATA # 1261 Site # 25079									
Perth Laboratory - NATA # 2377 Site # 2370									
External Laboratory									
126	1L0128	Apr 14, 2022		1L Passivated Canister	T22-Ap0044931	X	X	X	X
127	1L0050	Apr 14, 2022		1L Passivated Canister	T22-Ap0044932	X	X	X	X
128	1L0213	Apr 14, 2022		1L Passivated Canister	T22-Ap0044933	X	X	X	X
129	1L0157	Apr 14, 2022		1L Passivated Canister	T22-Ap0044934	X	X	X	X
130	1L0214	Apr 14, 2022		1L Passivated Canister	T22-Ap0044935	X	X	X	X
131	1L0107	Apr 19, 2022		1L Passivated Canister	T22-Ap0044936	X	X	X	X
132	1L0008	Apr 19, 2022		1L Passivated Canister	T22-Ap0044937	X	X	X	X

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Sample Detail						Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	US EPA Compendium Methods TO-15
Melbourne Laboratory - NATA # 1261 Site # 1254									
Sydney Laboratory - NATA # 1261 Site # 18217									
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X	X
Mayfield Laboratory - NATA # 1261 Site # 25079									
Perth Laboratory - NATA # 2377 Site # 2370									
External Laboratory									
133	1L0148	Apr 19, 2022		1L Passivated Canister	T22-Ap0044938	X	X	X	X
134	1L0065	Apr 19, 2022		1L Passivated Canister	T22-Ap0044939	X	X	X	X
135	1L0220	Apr 19, 2022		1L Passivated Canister	T22-Ap0044940	X	X	X	X
136	1L0069	Apr 19, 2022		1L Passivated Canister	T22-Ap0044941	X	X	X	X
137	1L0174	Apr 19, 2022		1L Passivated Canister	T22-Ap0044942	X	X	X	X
138	1L0088	Apr 19, 2022		1L Passivated Canister	T22-Ap0044943	X	X	X	X
139	1L0239	Apr 19, 2022		1L Passivated Canister	T22-Ap0044944	X	X	X	X

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Sample Detail						Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	US EPA Compendium Methods TO-15
Melbourne Laboratory - NATA # 1261 Site # 1254									
Sydney Laboratory - NATA # 1261 Site # 18217									
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X	X
Mayfield Laboratory - NATA # 1261 Site # 25079									
Perth Laboratory - NATA # 2377 Site # 2370									
External Laboratory									
140	1L0067	Apr 19, 2022		1L Passivated Canister	T22-Ap0044945	X	X	X	X
141	1L0096	Apr 19, 2022		1L Passivated Canister	T22-Ap0044946	X	X	X	X
142	1L0105	Apr 19, 2022		1L Passivated Canister	T22-Ap0044947	X	X	X	X
143	1L0221	Apr 19, 2022		1L Passivated Canister	T22-Ap0044948	X	X	X	X
144	6L0031	Apr 19, 2022		6L Passivated Canister	T22-Ap0044949	X	X	X	X
145	6L0017	Apr 19, 2022		6L Passivated Canister	T22-Ap0044950	X	X	X	X
146	6L0004	Apr 19, 2022		6L Passivated Canister	T22-Ap0044951	X	X	X	X

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Sample Detail						Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	US EPA Compendium Methods TO-15
Melbourne Laboratory - NATA # 1261 Site # 1254									
Sydney Laboratory - NATA # 1261 Site # 18217									
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X	X
Mayfield Laboratory - NATA # 1261 Site # 25079									
Perth Laboratory - NATA # 2377 Site # 2370									
External Laboratory									
147	6L0023	Apr 19, 2022		6L Passivated Canister	T22-Ap0044952	X	X	X	X
148	6L0046	Apr 20, 2022		6L Passivated Canister	T22-Ap0044953	X	X	X	X
149	1L0029	Apr 20, 2022		1L Passivated Canister	T22-Ap0044954	X	X	X	X
150	1L0150	Apr 20, 2022		1L Passivated Canister	T22-Ap0044955	X	X	X	X
151	1L0049	Apr 20, 2022		1L Passivated Canister	T22-Ap0044956	X	X	X	X
152	1L0068	Apr 20, 2022		1L Passivated Canister	T22-Ap0044957	X	X	X	X
153	1L0045	Apr 20, 2022		1L Passivated Canister	T22-Ap0044958	X	X	X	X

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Sample Detail						Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	US EPA Compendium Methods TO-15
Melbourne Laboratory - NATA # 1261 Site # 1254									
Sydney Laboratory - NATA # 1261 Site # 18217									
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X	X
Mayfield Laboratory - NATA # 1261 Site # 25079									
Perth Laboratory - NATA # 2377 Site # 2370									
External Laboratory									
154	1L0118	Apr 20, 2022		1L Passivated Canister	T22-Ap0044959	X	X	X	X
155	1L0247	Apr 20, 2022		1L Passivated Canister	T22-Ap0044960	X	X	X	X
156	1L0010	Apr 20, 2022		1L Passivated Canister	T22-Ap0044961	X	X	X	X
157	1L0126	Apr 20, 2022		1L Passivated Canister	T22-Ap0044962	X	X	X	X
158	1L0066	Apr 20, 2022		1L Passivated Canister	T22-Ap0044963	X	X	X	X
159	1L0089	Apr 20, 2022		1L Passivated Canister	T22-Ap0044964	X	X	X	X
160	1L0099	Apr 21, 2022		1L Passivated Canister	T22-Ap0044965	X	X	X	X

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Sample Detail						Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	US EPA Compendium Methods TO-15
Melbourne Laboratory - NATA # 1261 Site # 1254									
Sydney Laboratory - NATA # 1261 Site # 18217									
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X	X
Mayfield Laboratory - NATA # 1261 Site # 25079									
Perth Laboratory - NATA # 2377 Site # 2370									
External Laboratory									
161	1L0054	Apr 21, 2022		1L Passivated Canister	T22-Ap0044966	X	X	X	X
162	1L0122	Apr 21, 2022		1L Passivated Canister	T22-Ap0044967	X	X	X	X
163	1L0119	Apr 21, 2022		1L Passivated Canister	T22-Ap0044968	X	X	X	X
164	1L0006	Apr 21, 2022		1L Passivated Canister	T22-Ap0044969	X	X	X	X
165	1L0190	Apr 21, 2022		1L Passivated Canister	T22-Ap0044970	X	X	X	X
166	1L0202	Apr 21, 2022		1L Passivated Canister	T22-Ap0044971	X	X	X	X
167	1L0217	Apr 21, 2022		1L Passivated Canister	T22-Ap0044972	X	X	X	X

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Sample Detail						Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	US EPA Compendium Methods TO-15
Melbourne Laboratory - NATA # 1261 Site # 1254									
Sydney Laboratory - NATA # 1261 Site # 18217									
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X	X
Mayfield Laboratory - NATA # 1261 Site # 25079									
Perth Laboratory - NATA # 2377 Site # 2370									
External Laboratory									
168	1L0104	Apr 21, 2022		1L Passivated Canister	T22-Ap0044973	X	X	X	X
169	1L0144	Apr 21, 2022		1L Passivated Canister	T22-Ap0044974	X	X	X	X
170	1L0081	Apr 21, 2022		1L Passivated Canister	T22-Ap0044975	X	X	X	X
171	1L0223	Apr 21, 2022		1L Passivated Canister	T22-Ap0044976	X	X	X	X
172	6L0082	Apr 04, 2022		6L Passivated Canister	T22-My0015205	X	X	X	X
173	6L0076	Apr 04, 2022		6L Passivated Canister	T22-My0015206	X	X	X	X
174	1L0139	Apr 27, 2022		1L Passivated Canister	T22-My0015207	X	X	X	X

Company Name:	Eurofins mgt - QLD	Order No.:		Received:	Apr 1, 2022 12:00 AM
Address:	1/21 Smallwood Place Murarrie QLD 4712	Report #:	876359	Due:	Jul 21, 2022
		Phone:	07 3902 4600	Priority:	60 Day
		Fax:		Contact Name:	Canister Certification Report
Project Name:	CANISTER CERTIFICATION REPORT - APRIL				
Eurofins Analytical Services Manager : Ryan Gilbert					

Sample Detail						Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	US EPA Compendium Methods TO-15
Melbourne Laboratory - NATA # 1261 Site # 1254									
Sydney Laboratory - NATA # 1261 Site # 18217									
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X	X
Mayfield Laboratory - NATA # 1261 Site # 25079									
Perth Laboratory - NATA # 2377 Site # 2370									
External Laboratory									
175	1L0083	Apr 27, 2022		1L Passivated Canister	T22-My0015208	X	X	X	X
176	1L0047	Apr 27, 2022		1L Passivated Canister	T22-My0015209	X	X	X	X
177	1L0114	Apr 27, 2022		1L Passivated Canister	T22-My0015210	X	X	X	X
178	1L0033	Apr 27, 2022		1L Passivated Canister	T22-My0015211	X	X	X	X
179	1L0161	Apr 27, 2022		1L Passivated Canister	T22-My0015212	X	X	X	X
180	1L0245	Apr 27, 2022		1L Passivated Canister	T22-My0015213	X	X	X	X
181	1L0043	Apr 27, 2022		1L Passivated Canister	T22-My0015214	X	X	X	X

Company Name:	Eurofins mgt - QLD	Order No.:		Received:	Apr 1, 2022 12:00 AM
Address:	1/21 Smallwood Place Murarrie QLD 4712	Report #:	876359	Due:	Jul 21, 2022
		Phone:	07 3902 4600	Priority:	60 Day
		Fax:		Contact Name:	Canister Certification Report
Project Name:	CANISTER CERTIFICATION REPORT - APRIL				

Eurofins Analytical Services Manager : Ryan Gilbert

Sample Detail						Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	US EPA Compendium Methods TO-15
Melbourne Laboratory - NATA # 1261 Site # 1254									
Sydney Laboratory - NATA # 1261 Site # 18217									
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X	X
Mayfield Laboratory - NATA # 1261 Site # 25079									
Perth Laboratory - NATA # 2377 Site # 2370									
External Laboratory									
182	1L0233	Apr 27, 2022		1L Passivated Canister	T22-My0015215	X	X	X	X
183	1L0084	Apr 27, 2022		1L Passivated Canister	T22-My0015216	X	X	X	X
184	1L0057	Apr 27, 2022		1L Passivated Canister	T22-My0015217	X	X	X	X
185	1L0235	Apr 27, 2022		1L Passivated Canister	T22-My0015218	X	X	X	X
186	6L0010	Apr 27, 2022		6L Passivated Canister	T22-My0015219	X	X	X	X
187	6L0036	Apr 27, 2022		6L Passivated Canister	T22-My0015220	X	X	X	X
188	6L0043	Apr 27, 2022		6L Passivated Canister	T22-My0015221	X	X	X	X

Company Name:	Eurofins mgt - QLD	Order No.:		Received:	Apr 1, 2022 12:00 AM
Address:	1/21 Smallwood Place Murarrie QLD 4712	Report #:	876359	Due:	Jul 21, 2022
		Phone:	07 3902 4600	Priority:	60 Day
		Fax:		Contact Name:	Canister Certification Report
Project Name:	CANISTER CERTIFICATION REPORT - APRIL				

Eurofins Analytical Services Manager : Ryan Gilbert

Sample Detail						Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	US EPA Compendium Methods TO-15
Melbourne Laboratory - NATA # 1261 Site # 1254									
Sydney Laboratory - NATA # 1261 Site # 18217									
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X	X
Mayfield Laboratory - NATA # 1261 Site # 25079									
Perth Laboratory - NATA # 2377 Site # 2370									
External Laboratory									
189	6L0013	Apr 27, 2022		6L Passivated Canister	T22-My0015222	X	X	X	X
190	6L0025	Apr 27, 2022		6L Passivated Canister	T22-My0015223	X	X	X	X
191	6L0021	Apr 27, 2022		6L Passivated Canister	T22-My0015224	X	X	X	X
192	6L0015	Apr 27, 2022		6L Passivated Canister	T22-My0015225	X	X	X	X
193	6L1068	Apr 27, 2022		6L Passivated Canister	T22-My0015226	X	X	X	X
194	1L0243	Apr 28, 2022		1L Passivated Canister	T22-My0015227	X	X	X	X
195	1L0109	Apr 28, 2022		6L Passivated Canister	T22-My0015228	X	X	X	X

Company Name: Eurofins | mgt - QLD
Address: 1/21 Smallwood Place
Murarrie
QLD 4712

Project Name: CANISTER CERTIFICATION REPORT - APRIL

Order No.:
Report #: 876359
Phone: 07 3902 4600
Fax:

Received: Apr 1, 2022 12:00 AM
Due: Jul 21, 2022
Priority: 60 Day
Contact Name: Canister Certification Report

Eurofins Analytical Services Manager : Ryan Gilbert

Sample Detail						Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	US EPA Compendium Methods TO-15
Melbourne Laboratory - NATA # 1261 Site # 1254									
Sydney Laboratory - NATA # 1261 Site # 18217									
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X	X
Mayfield Laboratory - NATA # 1261 Site # 25079									
Perth Laboratory - NATA # 2377 Site # 2370									
External Laboratory									
196	1L0171	Apr 28, 2022		6L Passivated Canister	T22-My0015229	X	X	X	X
197	1L0163	Apr 28, 2022		6L Passivated Canister	T22-My0015230	X	X	X	X
198	1L0055	Apr 28, 2022		6L Passivated Canister	T22-My0015231	X	X	X	X
199	1L0172	Apr 28, 2022		6L Passivated Canister	T22-My0015232	X	X	X	X
200	1L0227	Apr 28, 2022		6L Passivated Canister	T22-My0015233	X	X	X	X
201	1L0132	Apr 28, 2022		6L Passivated Canister	T22-My0015234	X	X	X	X
202	1L0133	Apr 28, 2022		6L Passivated Canister	T22-My0015235	X	X	X	X

Company Name:	Eurofins mgt - QLD	Order No.:		Received:	Apr 1, 2022 12:00 AM
Address:	1/21 Smallwood Place Murarrie QLD 4712	Report #:	876359	Due:	Jul 21, 2022
		Phone:	07 3902 4600	Priority:	60 Day
		Fax:		Contact Name:	Canister Certification Report
Project Name:	CANISTER CERTIFICATION REPORT - APRIL				
Eurofins Analytical Services Manager : Ryan Gilbert					

Sample Detail						Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	US EPA Compendium Methods TO-15
Melbourne Laboratory - NATA # 1261 Site # 1254									
Sydney Laboratory - NATA # 1261 Site # 18217									
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X	X
Mayfield Laboratory - NATA # 1261 Site # 25079									
Perth Laboratory - NATA # 2377 Site # 2370									
External Laboratory									
203	1L0180	Apr 28, 2022		6L Passivated Canister	T22-My0015236	X	X	X	X
204	1L0077	Apr 28, 2022		6L Passivated Canister	T22-My0015237	X	X	X	X
205	1L0234	Apr 28, 2022		6L Passivated Canister	T22-My0015238	X	X	X	X
206	1L0225	Apr 04, 2022		1L Passivated Canister	T22-My0028698	X	X	X	X
207	1L0021	Apr 04, 2022		1L Passivated Canister	T22-My0028699	X	X	X	X
208	1L0019	Apr 04, 2022		1L Passivated Canister	T22-My0028700	X	X	X	X
209	1L0140	Apr 04, 2022		1L Passivated Canister	T22-My0028701	X	X	X	X

Company Name:	Eurofins mgt - QLD	Order No.:		Received:	Apr 1, 2022 12:00 AM
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		Phone:	07 3902 4600	Priority:	60 Day
		Fax:		Contact Name:	Canister Certification Report
Project Name:	CANISTER CERTIFICATION REPORT - APRIL				
Eurofins Analytical Services Manager : Ryan Gilbert					

Sample Detail						Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	US EPA Compendium Methods TO-15
Melbourne Laboratory - NATA # 1261 Site # 1254									
Sydney Laboratory - NATA # 1261 Site # 18217									
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X	X
Mayfield Laboratory - NATA # 1261 Site # 25079									
Perth Laboratory - NATA # 2377 Site # 2370									
External Laboratory									
210	1L0079	Apr 04, 2022		1L Passivated Canister	T22-My0028702	X	X	X	X
211	1L0106	Apr 04, 2022		1L Passivated Canister	T22-My0028703	X	X	X	X
212	1L0173	Apr 04, 2022		1L Passivated Canister	T22-My0028704	X	X	X	X
213	1L0070	Apr 04, 2022		1L Passivated Canister	T22-My0028705	X	X	X	X
214	1L0125	Apr 04, 2022		1L Passivated Canister	T22-My0028706	X	X	X	X
215	6L0008	Apr 04, 2022		6L Passivated Canister	T22-My0028707	X	X	X	X
216	6L0003	Apr 04, 2022		6L Passivated Canister	T22-My0028708	X	X	X	X

Company Name:	Eurofins mgt - QLD	Order No.:		Received:	Apr 1, 2022 12:00 AM
Address:	1/21 Smallwood Place Murarrie QLD 4712	Report #:	876359	Due:	Jul 21, 2022
		Phone:	07 3902 4600	Priority:	60 Day
		Fax:		Contact Name:	Canister Certification Report
Project Name:	CANISTER CERTIFICATION REPORT - APRIL				
Eurofins Analytical Services Manager : Ryan Gilbert					

Sample Detail	Dilution Factor	Final Pressure (psi)	Receipt Vac./Pressure (in Hg)	US EPA Compendium Methods TO-15
Melbourne Laboratory - NATA # 1261 Site # 1254				
Sydney Laboratory - NATA # 1261 Site # 18217				
Brisbane Laboratory - NATA # 1261 Site # 20794	X	X	X	X
Mayfield Laboratory - NATA # 1261 Site # 25079				
Perth Laboratory - NATA # 2377 Site # 2370				
External Laboratory				
Test Counts	215	215	215	216

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:

Misha Chin	Analytical Services Manager
Isaac McArthur	Senior Analyst-Air



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	: ES2213692	Page	: 1 of 7
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: Charlotte George	Contact	: Sarah Mathew
Address	: Level 7 24 Mitchell Street DARWIN NT, AUSTRALIA 0800	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: 12526136 Darwin Turf Club Monitoring Event	Date Samples Received	: 22-Apr-2022
Order number	: ----	Date Analysis Commenced	: 22-Apr-2022
C-O-C number	: ----	Issue Date	: 29-Apr-2022
Sampler	: Charlotte George		
Site	: ----		
Quote number	: SY/090/22 V3		
No. of samples received	: 9		
No. of samples analysed	: 7		



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 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



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**

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: 4305031)									
ES2213618-002	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: Chromium	7440-47-3	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: Nickel	7440-02-0	0.001	mg/L	0.004	0.005	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
ES2213600-002	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: Chromium	7440-47-3	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: 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	0.012	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 4305035)									
ES2213780-001	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	0.003	0.003	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.031	0.031	0.0	0% - 20%
		EG020A-F: Lead	7439-92-1	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.123	0.123	0.0	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.755	0.755	0.0	0% - 20%
ES2213797-009	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	0.002	0.002	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: 4305035) - continued									
ES2213797-009	Anonymous	EG020A-F: Chromium	7440-47-3	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: Nickel	7440-02-0	0.001	mg/L	0.074	0.075	0.0	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.019	0.020	0.0	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 4305162)									
ES2213618-004	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.008	0.008	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.012	0.010	10.9	No Limit
ES2212949-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 4305032)									
ES2213588-002	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2213669-002	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 4305183)									
ES2212949-003	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2213490-010	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4304127)									
ES2213692-001	MW01	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES2213797-004	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	270	260	0.0	0% - 50%
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4304127)									
ES2213692-001	MW01	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES2213797-004	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	260	260	0.0	0% - 50%
EP080: BTEXN (QC Lot: 4304127)									
ES2213692-001	MW01	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

Page : 4 of 7
 Work Order : ES2213692
 Client : GHD PTY LTD
 Project : 12526136 Darwin Turf Club Monitoring Event



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: 4304127) - continued									
ES2213692-001	MW01	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
ES2213797-004	Anonymous	EP080: Benzene	71-43-2	1	µg/L	111	110	0.0	0% - 20%
		EP080: Toluene	108-88-3	2	µg/L	26	26	0.0	0% - 50%
		EP080: Ethylbenzene	100-41-4	2	µg/L	5	5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	35	36	2.8	0% - 50%
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	16	17	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 (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 4305031)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	94.4	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	92.7	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	90.8	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	91.3	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	91.6	83.0	111
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	91.9	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	94.2	81.0	117
EG020F: Dissolved Metals by ICP-MS (QCLot: 4305035)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	95.4	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	92.0	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	90.0	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	91.1	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	91.6	83.0	111
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	92.2	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	92.9	81.0	117
EG020T: Total Metals by ICP-MS (QCLot: 4305162)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	104	82.0	114
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	104	84.0	112
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	102	86.0	116
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	103	83.0	118
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	102	85.0	115
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	102	84.0	116
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	105	79.0	117
EG035F: Dissolved Mercury by FIMS (QCLot: 4305032)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	90.7	83.0	105
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4305183)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	90.8	77.0	111
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4300589)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	71.3	55.8	112
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	87.9	71.6	113
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	83.4	56.0	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4304127)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	89.8	75.0	127

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: 4305031)							
EN2203548-002	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	89.1	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	93.7	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	93.5	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	93.4	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	85.0	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	93.3	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	94.9	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 4305035)							
ES2213697-001	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	91.0	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	89.5	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	85.9	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	89.9	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	81.9	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	90.7	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	91.0	70.0	130
EG020T: Total Metals by ICP-MS (QCLot: 4305162)							



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
EG020T: Total Metals by ICP-MS (QCLot: 4305162) - continued							
ES2212949-002	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	100	70.0	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	100	70.0	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	101	70.0	130
		EG020A-T: Copper	7440-50-8	1 mg/L	102	70.0	130
		EG020A-T: Lead	7439-92-1	1 mg/L	106	70.0	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	99.3	70.0	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	99.2	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 4305032)							
ES2213588-001	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	83.0	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4305183)							
ES2212949-004	Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	85.4	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4304127)							
ES2213692-001	MW01	EP080: C6 - C9 Fraction	----	325 µg/L	90.2	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4304127)							
ES2213692-001	MW01	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	87.8	70.0	130
EP080: BTEXN (QCLot: 4304127)							
ES2213692-001	MW01	EP080: Benzene	71-43-2	25 µg/L	88.1	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	104	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	103	70.0	130
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	106	70.0	130
			106-42-3				
		EP080: ortho-Xylene	95-47-6	25 µg/L	107	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	98.5	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES2213692	Page	: 1 of 5
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: Charlotte George	Telephone	: +61-2-8784 8555
Project	: 12526136 Darwin Turf Club Monitoring Event	Date Samples Received	: 22-Apr-2022
Site	: ----	Issue Date	: 29-Apr-2022
Sampler	: Charlotte George	No. of samples received	: 9
Order number	: ----	No. of samples analysed	: 7

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 Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
TRH - Semivolatile Fraction	0	16	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
TRH - Semivolatile Fraction	0	16	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 Plastic Bottle - Unfiltered; Lab-acidified (EG020A-F) MW01, MW03, MW05, MW07 MW02, MW04, MW06	20-Apr-2022	----	----	----	27-Apr-2022	17-Oct-2022	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020A-T) MW01, MW03, MW05, MW07 MW02, MW04, MW06	20-Apr-2022	27-Apr-2022	17-Oct-2022	✓	27-Apr-2022	17-Oct-2022	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG035F) MW01, MW03, MW05, MW07 MW02, MW04, MW06	20-Apr-2022	----	----	----	27-Apr-2022	04-May-2022	✓
EG035T: Total Recoverable Mercury by FIMS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG035T) MW01, MW03, MW05, MW07 MW02, MW04, MW06	20-Apr-2022	----	----	----	27-Apr-2022	18-May-2022	✓

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)		20-Apr-2022	22-Apr-2022	27-Apr-2022	✓	28-Apr-2022	01-Jun-2022	✓
MW01, MW03, MW05, MW07	MW02, MW04, MW06,							
Amber VOC Vial - Sulfuric Acid (EP080)		20-Apr-2022	27-Apr-2022	04-May-2022	✓	27-Apr-2022	04-May-2022	✓
MW01, MW03, MW05, MW07	MW02, MW04, MW06,							
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071)		20-Apr-2022	22-Apr-2022	27-Apr-2022	✓	28-Apr-2022	01-Jun-2022	✓
MW01, MW03, MW05, MW07	MW02, MW04, MW06,							
Amber VOC Vial - Sulfuric Acid (EP080)		20-Apr-2022	27-Apr-2022	04-May-2022	✓	27-Apr-2022	04-May-2022	✓
MW01, MW03, MW05, MW07	MW02, MW04, MW06,							
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)		20-Apr-2022	27-Apr-2022	04-May-2022	✓	27-Apr-2022	04-May-2022	✓
MW01, MW03, MW05, MW07	MW02, MW04, MW06,							



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	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	4	30	13.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	16	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	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	30	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	16	6.25	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	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	30	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	16	6.25	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	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	30	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	16	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.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. 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).
Total Mercury by FIMS	EG035T	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered 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
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)
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.

QUALITY CONTROL REPORT

Work Order	: ES2216156	Page	: 1 of 5
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: Charlotte George	Contact	: Sarah Mathew
Address	: Level 7 24 Mitchell Street DARWIN NT, AUSTRALIA 0800	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: 12526136 Darwin Turf Club Monitoring Event	Date Samples Received	: 13-May-2022
Order number	: ----	Date Analysis Commenced	: 17-May-2022
C-O-C number	: ----	Issue Date	: 20-May-2022
Sampler	: Charlotte George		
Site	: ----		
Quote number	: SY/090/22 V3		
No. of samples received	: 9		
No. of samples analysed	: 9		



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

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 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.

Laboratory Duplicate (DUP) Report

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: 4344249)									
ES2216156-001	MW01	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: Chromium	7440-47-3	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: 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	<0.005	<0.005	0.0	No Limit
ES2216525-002	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	0.002	0.002	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	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: 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	<0.005	<0.005	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 4344250)									
ES2216156-002	MW02	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4345248)									
ES2216156-001	MW01	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES2216156-007	MW05	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4345248)									
ES2216156-001	MW01	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES2216156-007	MW05	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 4345248)									

Page : 3 of 5
 Work Order : ES2216156
 Client : GHD PTY LTD
 Project : 12526136 Darwin Turf Club Monitoring Event



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: 4345248) - continued									
ES2216156-001	MW01	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
ES2216156-007	MW05	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			
					Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 4344249)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	91.7	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	91.4	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	90.0	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	90.3	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	88.3	83.0	111
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	88.5	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	93.1	81.0	117
EG035F: Dissolved Mercury by FIMS (QCLot: 4344250)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	96.0	83.0	105
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4338037)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	74.2	55.8	112
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	75.4	71.6	113
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	103	56.0	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4345248)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	81.1	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4338037)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	73.4	57.9	119
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	90.4	62.5	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	90.5	61.5	121
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4345248)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	85.3	75.0	127
EP080: BTEXN (QCLot: 4345248)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	91.6	70.0	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	99.3	69.0	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	95.4	70.0	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	95.7	69.0	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	99.9	72.0	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	103	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: 4344249)							
ES2216156-004	MW04	EG020A-F: Arsenic	7440-38-2	1 mg/L	98.9	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	91.9	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	90.3	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	93.9	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	89.4	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	91.2	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	90.5	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 4344250)							
ES2216156-003	MW03	EG035F: Mercury	7439-97-6	0.01 mg/L	91.8	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4345248)							
ES2216156-001	MW01	EP080: C6 - C9 Fraction	----	325 µg/L	86.2	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4345248)							
ES2216156-001	MW01	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	83.7	70.0	130
EP080: BTEXN (QCLot: 4345248)							
ES2216156-001	MW01	EP080: Benzene	71-43-2	25 µg/L	82.1	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	88.6	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	84.9	70.0	130
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	85.9	70.0	130
			106-42-3				
		EP080: ortho-Xylene	95-47-6	25 µg/L	91.0	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	93.5	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES2216156	Page	: 1 of 5
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: Charlotte George	Telephone	: +61-2-8784 8555
Project	: 12526136 Darwin Turf Club Monitoring Event	Date Samples Received	: 13-May-2022
Site	: ----	Issue Date	: 20-May-2022
Sampler	: Charlotte George	No. of samples received	: 9
Order number	: ----	No. of samples analysed	: 9

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.

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)		11-May-2022	17-May-2022	18-May-2022	✓	19-May-2022	26-Jun-2022	✓
MW01, MW03, MW04 - Interlab Duplicate, MW05, MW07	MW02, MW04, MW04 - Field Duplicate, MW06,							
Amber VOC Vial - Sulfuric Acid (EP080)		11-May-2022	19-May-2022	25-May-2022	✓	19-May-2022	25-May-2022	✓
MW01, MW03, MW04 - Interlab Duplicate, MW05, MW07	MW02, MW04, MW04 - Field Duplicate, MW06,							
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071)		11-May-2022	17-May-2022	18-May-2022	✓	19-May-2022	26-Jun-2022	✓
MW01, MW03, MW04 - Interlab Duplicate, MW05, MW07	MW02, MW04, MW04 - Field Duplicate, MW06,							
Amber VOC Vial - Sulfuric Acid (EP080)		11-May-2022	19-May-2022	25-May-2022	✓	19-May-2022	25-May-2022	✓
MW01, MW03, MW04 - Interlab Duplicate, MW05, MW07	MW02, MW04, MW04 - Field Duplicate, MW06,							
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)		11-May-2022	19-May-2022	25-May-2022	✓	19-May-2022	25-May-2022	✓
MW01, MW03, MW04 - Interlab Duplicate, MW05, MW07	MW02, MW04, MW04 - Field Duplicate, MW06,							



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	9	11.11	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	15	0.00	10.00	✗	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Dissolved Mercury by FIMS	EG035F	1	9	11.11	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	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Dissolved Mercury by FIMS	EG035F	1	9	11.11	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	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Dissolved Mercury by FIMS	EG035F	1	9	11.11	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	15	0.00	5.00	✗	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	5.26	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.

QUALITY CONTROL REPORT

Work Order	: ES2213685	Page	: 1 of 3
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: Charlotte George	Contact	: Sarah Mathew
Address	: Level 7 24 Mitchell Street DARWIN NT, AUSTRALIA 0800	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: 12526136 Darwin Turf Club Monitoring Event	Date Samples Received	: 21-Apr-2022
Order number	: ----	Date Analysis Commenced	: 26-Apr-2022
C-O-C number	: ----	Issue Date	: 27-Apr-2022
Sampler	: Charlotte George		
Site	: ----		
Quote number	: SY/090/22 V3		
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



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%.

- **No Laboratory Duplicate (DUP) Results are required to be reported.**



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: **SOIL**

Sub-Matrix: SOIL				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
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 4303593)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1 mg/kg	99.7	62.0	126
EP075G: Chlorinated Hydrocarbons (QCLot: 4303594)								
EP075: 1,3-Dichlorobenzene	541-73-1	0.5	mg/kg	<0.5	1.5 mg/kg	95.1	58.0	112
EP075: 1,4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5	1.5 mg/kg	92.6	58.0	116
EP075: 1,2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5	1.5 mg/kg	93.2	57.0	115
EP075: Hexachloroethane	67-72-1	0.5	mg/kg	<0.5	1.5 mg/kg	94.0	54.0	116
EP075: 1,2,4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5	1.5 mg/kg	98.4	62.9	108
EP075: Hexachloropropylene	1888-71-7	0.5	mg/kg	<0.5	1.5 mg/kg	99.0	39.1	110
EP075: Hexachlorobutadiene	87-68-3	0.5	mg/kg	<0.5	1.5 mg/kg	92.8	59.0	117
EP075: Hexachlorocyclopentadiene	77-47-4	2.5	mg/kg	<2.5	1.5 mg/kg	104	24.3	108
EP075: Pentachlorobenzene	608-93-5	0.5	mg/kg	<0.5	1.5 mg/kg	92.2	57.0	109
EP075: Hexachlorobenzene (HCB)	118-74-1	0.5	mg/kg	<0.5	1.5 mg/kg	96.6	59.0	111

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.

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES2213685	Page	: 1 of 4
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: Charlotte George	Telephone	: +61-2-8784 8555
Project	: 12526136 Darwin Turf Club Monitoring Event	Date Samples Received	: 21-Apr-2022
Site	: ----	Issue Date	: 27-Apr-2022
Sampler	: Charlotte George	No. of samples received	: 3
Order number	: ----	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: **SOIL**

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification
Method		QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)						
Polychlorinated Biphenyls (PCB)		0	3	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds		0	3	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)						
Polychlorinated Biphenyls (PCB)		0	3	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds		0	3	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: **SOIL**

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
EP066: Polychlorinated Biphenyls (PCB)								
Soil Glass Jar - Unpreserved (EP066)								
Oil - 01, Oil - 03	Oil - 02,	20-Apr-2022	26-Apr-2022	04-May-2022	✔	27-Apr-2022	05-Jun-2022	✔
EP075G: Chlorinated Hydrocarbons								
Soil Glass Jar - Unpreserved (EP075)								
Oil - 01, Oil - 03	Oil - 02,	20-Apr-2022	26-Apr-2022	04-May-2022	✔	27-Apr-2022	05-Jun-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: **SOIL**

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)							
Polychlorinated Biphenyls (PCB)	EP066	0	3	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	EP075	0	3	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Polychlorinated Biphenyls (PCB)	EP066	1	3	33.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	EP075	1	3	33.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Polychlorinated Biphenyls (PCB)	EP066	1	3	33.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	EP075	1	3	33.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Polychlorinated Biphenyls (PCB)	EP066	0	3	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
Semivolatile Organic Compounds	EP075	0	3	0.00	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
Polychlorinated Biphenyls (PCB)	EP066	SOIL	In house: Referenced to USEPA SW 846 - 8270 Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3).
Semivolatile Organic Compounds	EP075	SOIL	In house: Referenced to USEPA SW 846 - 8270 Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM Schedule B(3).
Preparation Methods	Method	Matrix	Method Descriptions
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

Appendix D

Results Tables



Appendix D Table 1
Groundwater Results

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	Unit	EQL	Well ID Date	MW01		MW02				
				20/04/2022	11/05/2022	17/01/2020	23/04/2020	28/04/2020	20/04/2022	11/05/2022
			Environment Protection Licence Trigger Levels (EPL218 Attachment B) (2018-2020)							
Field Parameters										
pH (Field)	pH units		6.0 - 8.0	5.66	5.75	5.86	5.46	5.45	6.51	5.58
Electrical conductivity (field)	µS/cm		20 - 250	302.2	309.6	505	528	490.1	436.5	319.5
DO (%S) (Field)	%S		80 - 110	21.2	3.8	27.4	5.6	8.3	92.9	4.4
Redox (Field)	mV			175	149.5	11.3	68.0	84.1	164.8	157.5
Temperature (Field)	°C			34.2	33.6	34.8	34.8	34.2	33.2	33.4
Turbidity (Field)	NTU		2 - 15	-	-	89.1	0.76	0.41	-	-
Metals										
Arsenic (filtered)	mg/L	0.001	0.094	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001
Cadmium (filtered)	mg/L	0.0001	0.0004	<0.0001	<0.0001	<0.0001	0.0003	<0.0001	<0.0001	<0.0001
Chromium (III+VI) (filtered)	mg/L	0.001	0.006	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (filtered)	mg/L	0.001	0.0018	<0.001	<0.001	<0.001	0.011	0.002	<0.001	0.002
Lead (filtered)	mg/L	0.001	0.0056	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001
Mercury (filtered)	mg/L	0.0001	0.0019	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel (filtered)	mg/L	0.001	0.013	<0.001	<0.001	<0.001	0.010	<0.001	0.002	0.002
Zinc (filtered)	mg/L	0.005	0.015	<0.005	<0.005	<0.005	0.113	0.007	<0.005	<0.005
BTEXN										
Benzene	µg/L	1	300	<1	<1	<1	<1	<1	<1	<1
Toluene	µg/L	2	300	<2	<2	<2	<2	<2	<2	<2
Ethylbenzene	µg/L	2	5	<2	<2	<2	<2	<2	<2	<2
Xylene (o)	µg/L	2		<2	<2	<2	<2	<2	<2	<2
Xylene (m & p)	µg/L	2		<2	<2	<2	<2	<2	<2	<2
Xylene Total	µg/L	2	75	<2	<2	<2	<2	<2	<2	<2
Naphthalene	µg/L	5		<5	<5	<5	<5	<5	<5	<5
BTEX (Sum of Total) - Lab Calc	µg/L	1		<1	<1	<1	<1	<1	<1	<1
TRH - NEPM 2013										
F1 (C6-C10 minus BTEX)	µg/L	20		<20	<20	<20	<20	<20	<20	<20
C6-C10 Fraction	µg/L	20		<20	<20	<20	<20	<20	<20	<20
F2 (>C10-C16 minus Naphthalene)	µg/L	100		<100	<100	<100	<100	<100	<100	<100
>C10-C16 Fraction	µg/L	100		<100	<100	<100	<100	<100	<100	<100
F3 (>C16-C34 Fraction)	µg/L	100		<100	<100	<100	<100	<100	<100	<100
F4 (>C34-C40 Fraction)	µg/L	100		<100	<100	<100	<100	<100	<100	<100
>C10-C40 (Sum of Total)	µg/L	100	600	<100	<100	<100	<100	<100	<100	<100



Appendix D Table 1
Groundwater Results

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		MW03										
		23/04/2020	28/04/2020	4/08/2020	8/09/2020	16/09/2020	20/04/2021	28/04/2021	7/09/2021	15/09/2021	20/04/2022	11/05/2022
	Unit											
Field Parameters												
pH (Field)	pH units	4.76	4.67	5.02	4.81	5.60	5.22	5.21	5.85	5.96	6.17	5.58
Electrical conductivity (field)	µS/cm	582	586	406.4	422.8	529	481.1	491.5	545	487.6	324.4	333.8
DO (%S) (Field)	%S	13.2	5	4.0	-3.7	-0.3	0.5	0.8	2.9	3.0	31.9	1.5
Redox (Field)	mV	209.4	236.7	229.0	202.1	-0.2	183.2	204.2	133.6	102.9	154.1	140.5
Temperature (Field)	°C	34.0	33.8	32.8	33.6	33.9	32.8	32.8	32.1	33.7	32.9	33.5
Turbidity (Field)	NTU	22.1	0	9.56	1.00	2,197	0.79	1.8	66.11	-	-	-
Metals												
Arsenic (filtered)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium (filtered)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	0.0001
Chromium (III+VI) (filtered)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (filtered)	mg/L	0.008	0.002	0.009	0.007	0.012	0.011	<0.001	0.142	0.002	<0.001	0.003
Lead (filtered)	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.008	<0.001	<0.001	<0.001
Mercury (filtered)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel (filtered)	mg/L	0.009	0.002	0.005	0.007	0.005	0.001	<0.001	0.021	0.001	<0.001	0.002
Zinc (filtered)	mg/L	0.048	0.010	0.040	0.039	0.038	0.010	<0.005	0.204	0.015	<0.005	0.008
BTEXN												
Benzene	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	µg/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Ethylbenzene	µg/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Xylene (o)	µg/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Xylene (m & p)	µg/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Xylene Total	µg/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Naphthalene	µg/L	<5	<5	<5	<5	<5	<5	<5	<1	<1	<5	<5
BTEX (Sum of Total) - Lab Calc	µg/L	<1	<1	<1	<1	<1	<1	<1	<5	<5	<1	<1
TRH - NEPM 2013												
F1 (C6-C10 minus BTEX)	µg/L	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
C6-C10 Fraction	µg/L	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
F2 (>C10-C16 minus Naphthalene)	µg/L	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C10-C16 Fraction	µg/L	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
F3 (>C16-C34 Fraction)	µg/L	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
F4 (>C34-C40 Fraction)	µg/L	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C10-C40 (Sum of Total)	µg/L	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100



Appendix D Table 1
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		MW04											
		17/01/2020	23/04/2020	28/04/2020	4/08/2020	8/09/2020	16/09/2020	20/04/2021	28/04/2021	7/09/2021	15/09/2021	20/04/2022	11/05/2022
	Unit												
Field Parameters													
pH (Field)	pH units	5.11	5.23	5.18	5.11	4.65	4.52	5.63	5.53	5.73	5.63	5.85	6.02
Electrical conductivity (field)	µS/cm	12521	6,273	6,729	9,850	18,810	20,888	7,055	8,828	24974	22088	17431	15605
DO (%S) (Field)	%S	32.1	20.1	14.8	11.3	2.81	-2.39	26.8	20.2	4.0	5.7	38	11.5
Redox (Field)	mV	193.3	213.1	229.2	302.6	247.2	225.9	145.9	229.3	-9.1	-60.9	42	-15
Temperature (Field)	°C	32.3	33.6	33.3	31.9	32.5	33.2	33.5	33.2	32.2	32.6	35.3	33.2
Turbidity (Field)	NTU	1,160	47.99	8.16	4.56	301.9	63.10	0.83	1.63	0.00	-	-	-
Metals													
Arsenic (filtered)	mg/L	<0.001	<0.001	<0.001	<0.001	0.002	0.003	0.001	<0.001	0.004	0.004	0.012	0.014
Cadmium (filtered)	mg/L	0.0001	0.0001	0.0002	0.0005	0.0009	0.0015	0.0002	0.0003	0.0006	0.0005	<0.0001	<0.0001
Chromium (III+VI) (filtered)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (filtered)	mg/L	<0.001	0.005	0.007	0.011	0.009	0.018	0.010	0.013	0.004	0.002	<0.001	0.001
Lead (filtered)	mg/L	0.004	<0.001	<0.001	0.001	0.002	0.003	<0.001	<0.001	<0.001	0.002	<0.001	<0.001
Mercury (filtered)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel (filtered)	mg/L	0.014	0.021	0.030	0.066	0.099	0.142	0.025	0.020	0.133	0.129	0.103	0.073
Zinc (filtered)	mg/L	0.067	0.093	0.140	0.291	0.430	0.571	0.095	0.074	0.461	0.450	0.023	0.028
BTEXN													
Benzene	µg/L	<1	<1	<1	<1	<1	<1	<1	<1			<1	<1
Toluene	µg/L	<2	<2	<2	<2	<2	<2	<2	<2			<2	<2
Ethylbenzene	µg/L	<2	<2	<2	<2	<2	<2	<2	<2			<2	<2
Xylene (o)	µg/L	<2	<2	<2	<2	<2	<2	<2	<2			<2	<2
Xylene (m & p)	µg/L	<2	<2	<2	<2	<2	<2	<2	<2			<2	<2
Xylene Total	µg/L	<2	<2	<2	<2	<2	<2	<2	<2			<2	<2
Naphthalene	µg/L	<5	<5	<5	<5	<5	<5	<5	<5			<5	<5
BTEX (Sum of Total) - Lab Calc	µg/L	<1	<1	<1	<1	<1	<1	<1	<1			<1	<1
TRH - NEPM 2013													
F1 (C6-C10 minus BTEX)	µg/L	<20	<20	<20	<20	<20	<20	<20	<20			<20	<20
C6-C10 Fraction	µg/L	<20	<20	<20	<20	<20	<20	<20	<20			<20	<20
F2 (>C10-C16 minus Naphthalene)	µg/L	<100	<100	<100	<100	<100	<100	<100	<100			<100	<100
>C10-C16 Fraction	µg/L	<100	<100	<100	<100	<100	<100	<100	<100			<100	<100
F3 (>C16-C34 Fraction)	µg/L	<100	<100	<100	<100	<100	<100	<100	<100			<100	<100
F4 (>C34-C40 Fraction)	µg/L	<100	<100	<100	<100	<100	<100	<100	<100			<100	<100
>C10-C40 (Sum of Total)	µg/L	<100	<100	<100	<100	<100	<100	<100	<100			<100	<100



Appendix D Table 1
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		MW05											
		17/01/2020	23/04/2020	28/04/2020	4/08/2020	8/09/2020	16/09/2020	20/04/2021	28/04/2021	7/09/2021	15/09/2021	20/04/2022	11/05/2022
	Unit												
Field Parameters													
pH (Field)	pH units	5.93	5.59	5.67	6.28	5.96	6.04	4.89	5.66	6.61	6.39	5.58	5.75
Electrical conductivity (field)	µS/cm	107.3	95.1	93.6	77.4	112.0	110.4	230.5	99.4	96.6	85.8	145.2	144.4
DO (%S) (Field)	%S	69.3	81.7	85.3	95.7	89.1	96.8	51.8	80.7	78.4	83.6	74.8	57.4
Redox (Field)	mV	153.5	205.4	217.1	262.4	171.0	116.9	241.4	212.6	161.2	151.2	147.6	150.5
Temperature (Field)	°C	31.2	32.5	32.4	31.0	32.3	33.1	32.3	31.8	30.6	31.3	32.1	32.9
Turbidity (Field)	NTU	608	0.33	1.79	2.26	4.86	1.27	1.96	0.67	356.14	-	-	-
Metals													
Arsenic (filtered)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium (filtered)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium (III+VI) (filtered)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (filtered)	mg/L	<0.001	0.009	0.003	0.007	0.007	0.007	0.011	0.009	0.058	0.002	<0.001	0.002
Lead (filtered)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	0.004	<0.001	<0.001	<0.001
Mercury (filtered)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel (filtered)	mg/L	<0.001	0.006	0.006	0.009	0.005	0.004	<0.001	<0.001	0.009	<0.001	<0.001	<0.001
Zinc (filtered)	mg/L	<0.005	0.039	0.062	0.061	0.021	0.026	<0.005	<0.005	0.099	0.019	<0.005	<0.005
BTEXN													
Benzene	µg/L	<1	<1	<1	<1	<1	<1	<1	<1			<1	<1
Toluene	µg/L	<2	<2	<2	<2	<2	<2	<2	<2			<2	<2
Ethylbenzene	µg/L	<2	<2	<2	<2	<2	<2	<2	<2			<2	<2
Xylene (o)	µg/L	<2	<2	<2	<2	<2	<2	<2	<2			<2	<2
Xylene (m & p)	µg/L	<2	<2	<2	<2	<2	<2	<2	<2			<2	<2
Xylene Total	µg/L	<2	<2	<2	<2	<2	<2	<2	<2			<2	<2
Naphthalene	µg/L	<5	<5	<5	<5	<5	<5	<5	<5			<5	<5
BTEX (Sum of Total) - Lab Calc	µg/L	<1	<1	<1	<1	<1	<1	<1	<1			<1	<1
TRH - NEPM 2013													
F1 (C6-C10 minus BTEX)	µg/L	<20	<20	<20	<20	<20	<20	<20	<20			<20	<20
C6-C10 Fraction	µg/L	<20	<20	<20	<20	<20	<20	<20	<20			<20	<20
F2 (>C10-C16 minus Naphthalene)	µg/L	<100	<100	<100	<100	<100	<100	<100	<100			<100	<100
>C10-C16 Fraction	µg/L	<100	<100	<100	<100	<100	<100	<100	<100			<100	<100
F3 (>C16-C34 Fraction)	µg/L	<100	<100	<100	<100	<100	<100	<100	<100			<100	<100
F4 (>C34-C40 Fraction)	µg/L	<100	<100	<100	<100	<100	<100	<100	<100			<100	<100
>C10-C40 (Sum of Total)	µg/L	<100	<100	<100	<100	<100	<100	<100	<100			<100	<100



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		MW06											
		17/01/2020	23/04/2020	28/04/2020	4/08/2020	8/09/2020	16/09/2020	20/04/2021	28/04/2021	7/09/2021	15/09/2021	20/04/2022	11/05/2022
	Unit												
Field Parameters													
pH (Field)	pH units	5.05	4.63	4.69	4.61	4.35	4.32	4.90	4.97	5.60	5.56	5.33	5.55
Electrical conductivity (field)	µS/cm	232.2	353.4	290.9	109.8	107.9	103.9	355.0	338.3	111.3	94.7	343.8	285.2
DO (%S) (Field)	%S	60.0	4.7	4.6	5.9	7.79	20.2	7.4	1.8	20.8	22.6	36.5	2.6
Redox (Field)	mV	221.5	208.1	201.9	283.1	245.1	249.8	215.5	219.9	195.5	181.9	195	170.7
Temperature (Field)	°C	32.5	33.0	32.4	31.7	33.5	34.1	31.6	31.2	32.4	32.3	32.4	32.2
Turbidity (Field)	NTU	359	1.56	4.66	11.02	7.94	12.10	1.87	2.10	395.5	-	-	-
Metals													
Arsenic (filtered)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.003	<0.001	<0.001
Cadmium (filtered)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium (III+VI) (filtered)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (filtered)	mg/L	<0.001	0.011	0.005	0.002	0.016	0.007	0.005	0.164	0.003	0.001	<0.001	0.002
Lead (filtered)	mg/L	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	0.006	<0.001	<0.001	<0.001	<0.001
Mercury (filtered)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel (filtered)	mg/L	<0.001	0.010	0.001	0.002	0.010	0.004	<0.001	0.022	0.001	0.001	0.002	0.003
Zinc (filtered)	mg/L	<0.005	0.065	0.021	0.011	0.060	0.028	0.014	0.206	0.018	0.015	0.008	0.014
BTEXN													
Benzene	µg/L	<1	<1	<1	<1	<1	<1	<1	<1			<1	<1
Toluene	µg/L	<2	<2	<2	<2	<2	<2	<2	<2			<2	<2
Ethylbenzene	µg/L	<2	<2	<2	<2	<2	<2	<2	<2			<2	<2
Xylene (o)	µg/L	<2	<2	<2	<2	<2	<2	<2	<2			<2	<2
Xylene (m & p)	µg/L	<2	<2	<2	<2	<2	<2	<2	<2			<2	<2
Xylene Total	µg/L	<2	<2	<2	<2	<2	<2	<2	<2			<2	<2
Naphthalene	µg/L	<5	<5	<5	<5	<5	<5	<5	<5			<5	<5
BTEX (Sum of Total) - Lab Calc	µg/L	<1	<1	<1	<1	<1	<1	<1	<1			<1	<1
TRH - NEPM 2013													
F1 (C6-C10 minus BTEX)	µg/L	<20	<20	<20	<20	<20	<20	<20	<20			<20	<20
C6-C10 Fraction	µg/L	<20	<20	<20	<20	<20	<20	<20	<20			<20	<20
F2 (>C10-C16 minus Naphthalene)	µg/L	<100	<100	<100	<100	<100	<100	<100	<100			<100	<100
>C10-C16 Fraction	µg/L	<100	<100	<100	<100	<100	<100	<100	<100			<100	<100
F3 (>C16-C34 Fraction)	µg/L	<100	<100	<100	<100	<100	<100	<100	<100			<100	<100
F4 (>C34-C40 Fraction)	µg/L	<100	<100	<100	<100	<100	<100	<100	<100			<100	<100
>C10-C40 (Sum of Total)	µg/L	<100	<100	<100	<100	<100	<100	<100	<100			<100	<100



Appendix D Table 1
Groundwater Results

Darwin Turf Club Inc.
EPL Monitoring GME and Air Monitoring Report
April 2022

		MW07										
		23/04/2020	28/04/2020	4/08/2020	8/09/2020	16/09/2020	20/04/2021	28/04/2021	7/09/2021	15/09/2021	20/04/2022	11/05/2022
	Unit											
Field Parameters												
pH (Field)	pH units	4.24	4.17	4.81	4.53	4.07	4.46	4.45	5.46	5.04	4.9	5.11
Electrical conductivity (field)	µS/cm	176.4	186.4	1,651	2,599	1,710	281.8	331.4	2261	1925	149.1	127.0
DO (%S) (Field)	%S	31.3	28.3	6.5	1.30	25.6	20.5	31.6	11.9	20.5	43.7	28.7
Redox (Field)	mV	236.0	256.7	179.9	179.0	247.1	199.9	233.5	210.5	216.0	225.6	198.3
Temperature (Field)	°C	31.1	31.1	30.8	32.5	32.7	30.3	30.4	30.2	31.1	30.7	31.1
Turbidity (Field)	NTU	0	13	6.66	35.96	20.11	2.18	2.14	2.30	-	-	-
Metals												
Arsenic (filtered)	mg/L	<0.001	<0.001	0.004	0.004	0.001	<0.001	<0.001	0.003	0.001	<0.001	<0.001
Cadmium (filtered)	mg/L	<0.0001	<0.0001	0.0002	0.0002	0.0004	<0.0001	<0.0001	0.0003	0.0002	<0.0001	<0.0001
Chromium (III+VI) (filtered)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (filtered)	mg/L	0.007	0.003	0.009	0.006	0.007	0.010	0.010	0.144	0.004	<0.001	0.002
Lead (filtered)	mg/L	0.002	<0.001	0.004	0.004	0.011	<0.001	0.003	0.012	0.006	<0.001	<0.001
Mercury (filtered)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel (filtered)	mg/L	0.008	0.002	0.008	0.007	0.010	<0.001	0.001	0.024	0.004	0.001	<0.001
Zinc (filtered)	mg/L	0.056	0.012	0.062	0.020	0.031	<0.005	<0.005	0.208	0.022	0.007	<0.005
BTEXN												
Benzene	µg/L	<1	<1	<1	<1	<1	<1	<1			<1	<1
Toluene	µg/L	<2	<2	<2	<2	<2	<2	<2			<2	<2
Ethylbenzene	µg/L	<2	<2	<2	<2	<2	<2	<2			<2	<2
Xylene (o)	µg/L	<2	<2	<2	<2	<2	<2	<2			<2	<2
Xylene (m & p)	µg/L	<2	<2	<2	<2	<2	<2	<2			<2	<2
Xylene Total	µg/L	<2	<2	<2	<2	<2	<2	<2			<2	<2
Naphthalene	µg/L	<5	<5	<5	<5	<5	<5	<5			<5	<5
BTEX (Sum of Total) - Lab Calc	µg/L	<1	<1	<1	<1	<1	<1	<1			<1	<1
TRH - NEPM 2013												
F1 (C6-C10 minus BTEX)	µg/L	<20	<20	<20	<20	<20	<20	<20			<20	<20
C6-C10 Fraction	µg/L	<20	<20	<20	<20	<20	<20	<20			<20	<20
F2 (>C10-C16 minus Naphthalene)	µg/L	<100	<100	<100	<100	<100	<100	<100			<100	<100
>C10-C16 Fraction	µg/L	<100	<100	<100	<100	<100	<100	<100			<100	<100
F3 (>C16-C34 Fraction)	µg/L	<100	<100	<100	<100	<100	<100	<100			<100	<100
F4 (>C34-C40 Fraction)	µg/L	<100	<100	<100	<100	<100	<100	<100			<100	<100
>C10-C40 (Sum of Total)	µg/L	<100	<100	<100	<100	<100	<100	<100			<100	<100



Appendix D Table 2
Air Quality Results

Darwin Turf Club Inc.
EPL Monitoring GME and Air Monitoring Report
April/May 2022

			Location ID	AQM01					AQM02					AQM03				
			Date	27/04/2020	15/09/2020	27/04/2021	14/09/2021	10/05/2022	27/04/2020	15/09/2020	27/04/2021	14/09/2021	10/05/2022	27/04/2020	15/09/2020	27/04/2021	14/09/2021	10/05/2022
	Unit	EQL	Environment Protection Licence Trigger Levels (EPL218) (Appendix C) (2018-2020)															
BTEXN																		
	Benzene	ppb	0.0016	0.010	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.004	<0.003	<0.003	<0.004
	Toluene	ppb	0.0075	3.766	0.0096	<0.0075	0.043	<0.0075	<0.0075	<0.0075	<0.0075	0.016	<0.0075	<0.0075	<0.0075	0.029	<0.0075	<0.0075
	Ethylbenzene	ppb	0.0022		<0.004	<0.005	0.011	<0.004	<0.004	<0.004	<0.003	0.0047	<0.004	<0.004	<0.004	<0.005	<0.004	0.0039
	Xylene (o)	ppb	0.0022	1.085	<0.004	<0.005	<0.004	<0.004	<0.004	<0.004	<0.003	<0.004	<0.004	<0.004	<0.004	<0.005	<0.004	<0.005
	Xylene (m & p)	ppb	0.0044	2.170	<0.008	<0.009	0.033	<0.008	<0.009	<0.009	<0.007	0.012	<0.008	<0.009	<0.009	<0.01	<0.008	<0.01
PAHs - standard 16																		
	Naphthalene	ppb	0.0105		<0.021	<0.023	<0.018	<0.019	<0.022	<0.022	<0.017	<0.019	<0.019	<0.021	<0.022	<0.025	<0.019	<0.025



**Appendix D Table 3
Track Conditioning Oil Results**

Darwin Turf Club EPL Monitoring
April/May 2022

			Date	20/04/2022			28/04/2022
			Field ID	Oil - 01	Oil - 02	Oil - 03	Oil - 04
			Depth				
			Lab Report Number	ES2213685	ES2213685	ES2213685	M22-Ap0056687
	Unit	LOR					
OC Pesticides							
Hexachlorobenzene	m g/kg	1.0		< 30.0	< 30.0	< 30.0	
Chlorinated Hydrocarbons							
1,2,4-trichlorobenzene	m g/kg	0.5		< 30.0	< 30.0	< 30.0	
1,2-dichlorobenzene	m g/kg	0.5		< 30.0	< 30.0	< 30.0	
1,4-dichlorobenzene	m g/kg	0.5		< 30.0	< 30.0	< 30.0	
Hexachlorobutadiene	m g/kg	0.5		< 30.0	< 30.0	< 30.0	
PCBs							
PCBs (Total)	µg/kg	100		< 200	< 200	< 200	
SVOCs							
Hexachlorocyclopentadiene	m g/kg	2.5		< 30.0	< 30.0	< 30.0	
Hexachloroethane	m g/kg	0.5		< 30.0	< 30.0	< 30.0	
Hexachloropropene	m g/kg	0.5		< 30.0	< 30.0	< 30.0	
Pentachlorobenzene	m g/kg	0.5		< 30.0	< 30.0	< 30.0	
VOCs							
1,3-dichlorobenzene	m g/kg	0.5		< 30.0	< 30.0	< 30.0	
PFAS - Eurofins Lab Results							
PFAS- Fluorotelomer Sulfonic Acids							
Perfluorodecanesulfonic acid (8:2 FTSA)	µg/L	0.01					< 100
Perfluorododecanesulfonic acid (10:2 FTSA)	µg/L	0.01					< 100
Perfluorohexanesulfonic acid (4:2 FTSA)	µg/L	0.01					< 100
Perfluorooctanesulfonic acid (6:2 FTSA)	µg/L	0.5					< 100
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	µg/L	0.05					< 100
Perfluorodecanoic acid (PFDA)	µg/L	0.01					< 100
Perfluorododecanoic acid (PFDoDA)	µg/L	0.01					< 100
Perfluoroheptanoic acid (PFHpA)	µg/L	0.01					< 100
Perfluorohexanoic acid (PFHxA)	µg/L	0.01					< 100
Perfluorononanoic acid (PFNA)	µg/L	0.01					< 100
Perfluorooctanoic acid (PFOA)	µg/L	0.01					< 100
Perfluoropentanoic acid (PFPeA)	µg/L	0.01					< 100
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.01					< 100
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.01					< 100
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.01					< 100
PFAS - Perfluoroalkyl Sulfonamide							
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-	µg/L	0.05					< 100
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-	µg/L	0.05					< 100
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	µg/L	0.05					< 100
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-	µg/L	0.05					< 100
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	µg/L	0.05					< 100
N-methyl-perfluorooctanesulfonamidoacetic acid (N-	µg/L	0.05					< 100
Perfluorooctane sulfonamide (FOSA)	µg/L	0.05					< 100



**Appendix D Table 3
Track Conditioning Oil Results**

Darwin Turf Club EPL Monitoring
April/May 2022

			Date	20/04/2022			28/04/2022
			Field ID	Oil - 01	Oil - 02	Oil - 03	Oil - 04
			Depth				
			Lab Report Number	ES2213685	ES2213685	ES2213685	M22-Ap0056687
	Unit	LOR					
OC Pesticides							
Hexachlorobenzene	mg/kg	1.0		< 30.0	< 30.0	< 30.0	
Chlorinated Hydrocarbons							
Perfluoroalkyl sulfonic acids (PFSA's)							
Perfluorobutanesulfonic acid (PFBS)	µg/L	0.01					< 100
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.01					< 100
Perfluoroheptanesulfonic acid (PFHpS)	µg/L	0.01					< 100
Perfluorohexanesulfonic acid (PFHxS)	µg/L	0.01					< 100
Perfluorononanesulfonic acid (PFNS)	µg/L	0.01					< 100
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01					< 100
Perfluoropentanesulfonic acid (PFPeS)	µg/L	0.01					< 100
Perfluoropropanesulfonic acid (PFPrS)	µg/L	0.01					< 100
PFAS - Sums							
Sum (PFHxS+ PFOS)*	µg/L	0.01					< 100
Sum of enHealth PFAS (PFHxS+ PFOS+ PFOA)*	µg/L	0.01					< 100
Sum of PFASs (n= 30)*	µg/L	0.01					< 100
Sum of USEPA PFAS (PFOS+ PFOA)*	µg/L	0.01					< 100
Sum of WA DWER PFAS (n= 10)*	µg/L	0.05					< 100



Appendix D
Table 4 RPD Values

Lab Report Number			Date	11/05/2022		RPD Value	11/05/2022		RPD Value
			Field ID	MW04	Duplicate		MW04	Duplicate	
				ES2216156			ES2216156		
	Unit	EQL							
Metals									
Arsenic (filtered)	mg/L	0.001	0.014	0.012	15	0.014	0.014	0	
Cadmium (filtered)	mg/L	0.0001	< 0.0001	< 0.0001	0	< 0.0001	< 0.0001	0	
Chromium (III+ VI) (filtered)	mg/L	0.001	< 0.001	< 0.001	0	< 0.001	< 0.001	0	
Copper (filtered)	mg/L	0.001	0.001	< 0.001	-	0.001	< 0.001	-	
Lead (filtered)	mg/L	0.001	< 0.001	< 0.001	0	< 0.001	< 0.001	0	
Mercury (filtered)	mg/L	0.0001	< 0.0001	< 0.0001	0	< 0.0001	< 0.0001	0	
Nickel (filtered)	mg/L	0.001	0.073	0.068	7	0.073	0.070	4	
Zinc (filtered)	mg/L	0.005	0.028	0.023	20	0.028	0.025	11	
BTEXN									
Benzene	µg/L	1	< 1	< 1	0	< 1	< 1	0	
Toluene	µg/L	2	< 2	< 2	0	< 2	< 2	0	
Ethylbenzene	µg/L	2	< 2	< 2	0	< 2	< 2	0	
Xylene (o)	µg/L	2	< 2	< 2	0	< 2	< 2	0	
Xylene (m & p)	µg/L	2	< 2	< 2	0	< 2	< 2	0	
Xylene Total	µg/L	2	< 2	< 2	0	< 2	< 2	0	
BTEX (Sum of Total) - Lab Calc	µg/L	1	< 1	< 1	0	< 1	< 1	0	
Naphthalene	µg/L	5	< 5	< 5	0	< 5	< 5	0	
TRH - NEPM 2013									
F1 (C6-C10 minus BTEX)	µg/L	20	< 20	< 20	0	< 20	< 20	0	
C6-C10 Fraction	µg/L	20	< 20	< 20	0	< 20	< 20	0	
F2 (> C10-C16 minus	µg/L	100	< 100	< 100	0	< 100	< 100	0	
> C10-C16 Fraction	µg/L	100	< 100	< 100	0	< 100	< 100	0	
F3 (> C16-C34 Fraction)	µg/L	100	< 100	< 100	0	< 100	< 100	0	
F4 (> C34-C40 Fraction)	µg/L	100	< 100	< 100	0	< 100	< 100	0	
> C10-C40 (Sum of Total)	µg/L	100	< 100	< 100	0	< 100	< 100	0	
TRH - NEPM 1999									
C6-C9 Fraction	µg/L	20	< 20	< 20	0	< 20	< 20	0	
C10-C14 Fraction	µg/L	50	< 50	< 50	0	< 50	< 50	0	
C15-C28 Fraction	µg/L	100	< 100	< 100	0	< 100	< 100	0	
C29-C36 Fraction	µg/L	50	< 50	< 50	0	< 50	< 50	0	
C10-C36 (Sum of Total)	µg/L	50	< 50	< 50	0	< 50	< 50	0	

*RPDs have only been considered where a concentration is greater than 1 times the EQL.

**Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each EQL multiplier range are: 30 (1 - 10 x EQL); 30 (10 - 30 x EQL); 30 (> 30 x EQL))

***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory

Appendix E

EPL 218-01

ENVIRONMENT PROTECTION LICENCE

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

Licensee	Darwin Turf Club Inc.
Licence Number	EPL218 - 01
Registered Business Address	Darwin Turf Club Inc. 20 Dick Ward Drive Fannie Bay NT 0820
ABN	21 373 066 193
Premises Address	Lot 05298 Town of Darwin plan(s) S 79/109 20 DICK WARD DR, FANNIE BAY
Anniversary Date:	01 September
Commencement Date:	01/09/2017
Expiry Date:	31/08/2022
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	Application of <i>waste mixtures, or waste emulsions, of oil and water or hydrocarbon and water</i> by disposal to Darwin Turf Club Fannie Bay Racecourse for the purpose of conditioning the track twice yearly.

ENVIRONMENT PROTECTION LICENCE 218 - 01

Table 1 - Listed Wastes Authorised to be Handled

Listed Waste	Collection	Transport	Storage	Treatment	Recycling	Disposal
Waste mixtures, or waste emulsions, of oil and water or hydrocarbon and water	✗	✗	✗	✗	✗	✓

✓ Activity authorised by this licence

✗ Activity not authorised by this licence

ENVIRONMENT PROTECTION LICENCE 218 - 01

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ATTACHMENTS

- 1 Environmental Monitoring Program.pdf

ENVIRONMENT PROTECTION LICENCE 218 - 01

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.

ENVIRONMENT PROTECTION LICENCE 218 - 01

- The following EPOs and Beneficial Use Declarations (BUDs) are relevant to this licence:
 - Darwin Harbour Region: Aquaculture, environment, cultural, rural stock and domestic

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
- Ramsar Wetland

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.

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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 notify the NT EPA prior to making any operational change that will cause, or is likely to cause, an increase in the potential for environmental harm.
- 4 The licensee must pay the annual fee calculated in accordance with the method prescribed in the Regulations within 10 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.
- 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 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.
- 7 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).
- 8 The licensee must implement, maintain and follow the documents listed in Table 2.

Table 2 - Documents Relevant to the Licenced Activity

Document Ref.	Document Name
12526136	Fannie Bay Racecourse Environmental Management Plan (EMP) for the Application of Used Oil, Rev 0, 21 January 2022

- 9 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:
 - 9.1 a tabulated summary of the amendment(s) with document references;
 - 9.2 reasons for the amendment(s); and
 - 9.3 an assessment of environmental risk associated with the amendment(s).
- 10 The NT EPA may require the licensee to revise or amend and resubmit any document relating to this licence. 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.
- 11 The licensee must, for the duration of this licence, implement, maintain and follow a Consultation and Communication Plan which includes a strategy for communicating with persons who are likely to have a real interest in, or be affected by, the activity.
- 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:

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- 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 licensee, 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 activity, do all things reasonable and practicable to ensure the activity does not adversely affect the Declared Beneficial Uses and Objectives as declared from time to time, including those applying to:
- *Darwin Harbour Region*
- 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; and
 - 18.3 is operated by a person trained to use the plant and equipment.
- 19 The licensee must notify the NT EPA, two weeks in advance, of the proposed dates for the application of listed waste to the track at the premises.

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- 20 The licensee must ensure that all listed waste being transported to the premises is transported by a person licenced under section 30 of the WMPC Act to transport the listed waste.

DISCHARGES AND EMISSIONS

- 21 The licensee must not allow a contaminant or waste, which causes or may cause environmental harm, to enter water.
- 22 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.)
- 23 The licensee must ensure that stormwater does not come into contact with a contaminant or waste, which causes or may cause environmental harm.
- 24 The licensee must ensure that discharges from the premises do not:
- 24.1 contain any floating debris, oil, grease, petroleum hydrocarbon sheen, scum, litter or other objectionable matter;
 - 24.2 cause or generate odours which would adversely affect the use of surrounding waters;
 - 24.3 cause visible change in the behaviour of fish or other aquatic organisms in the receiving water;
 - 24.4 cause algal blooms in the receiving water;
 - 24.5 cause mortality of fish or other aquatic organisms; or
 - 24.6 cause adverse impacts on plants.
- 25 The activity must not cause or release, beyond the boundary of the premises offensive odour.

MONITORING

- 26 The licensee must conduct air and groundwater monitoring at the authorised monitoring points in accordance with Attachment 1 of this licence ("the Monitoring Plan") and sections 9.2 and 9.3 of the EMP referred to at Table 2.
- 27 The licensee must develop, implement and maintain a surface water quality-monitoring program to monitor for total recoverable hydrocarbons and benzene, toluene, ethylbenzene and xylene (BTEX) in surface water leaving the premises. A copy of the surface water quality-monitoring program must be submitted to the NT EPA by 30 June 2022.
- 28 Prior to the application of listed waste (per Table 1) to the Fannie Bay Racecourse, the licensee must analyse a representative sample (to the extent practicable) of the listed waste to be applied, to ensure its composition is not contaminated by other listed waste including, but not limited to, polychlorinated biphenyls and per- and polyfluoroalkyl substances (PFAS). Samples for PFAS must be analysed at a NATA accredited laboratory that can conduct ultra-trace analysis.
- 29 The NT EPA may require the licensee to revise or amend and resubmit the Monitoring Plan. Where the NT EPA requires the Monitoring Plan to be resubmitted, the licensee must submit it to the NT EPA by the date specified by the NT EPA.
- 30 The licensee must ensure that any proposed revisions to the Monitoring Plan (other than typographical changes or revisions to formatting or referencing) are:

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- 30.1 reviewed by a suitably Qualified person, who must produce a written report about their review;
 - 30.2 submitted to the NT EPA with justification for revisions; and
 - 30.3 submitted to the NT EPA, in electronic form (with a complete copy of the Qualified person's written review), 20 business days prior to the proposed implementation date.
- 31 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.
- 32 The licensee must ensure any samples collected in accordance with the Monitoring Plan or in connection with the activity or this licence, are obtained by, or under the supervision of a Qualified sampler.
- 33 The licensee must ensure that, for each sample collected in accordance with the Monitoring Plan or the activity the following information must be recorded and retained:
- 33.1 the date on which the sample was collected;
 - 33.2 the time at which the sample was collected;
 - 33.3 the location at which the sample was collected;
 - 33.4 the name of the person who collected the sample;
 - 33.5 the chain of custody forms relating to the sample;
 - 33.6 the field measurements (if any) and analytical results (if any) relating to the sample; and
 - 33.7 laboratory quality assurance and quality control documentation.

RECORDING AND REPORTING

- 34 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:
- 34.1 the source of the listed waste;
 - 34.2 the name of the transport company, if not the licensee;
 - 34.3 a description of the listed waste;
 - 34.4 the quantity of the listed waste; and
 - 34.5 whether the listed waste was stored, recycled, treated or disposed of.
- 35 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.
- 36 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.
- 37 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.
- 38 The licensee must include in the notification of non-compliance the following information:
- 38.1 when the non-compliance was detected and by whom;
 - 38.2 the date and time of the non-compliance;

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- 38.3 the actual and potential causes and contributing factors to the non-compliance;
 - 38.4 the risk of environmental harm arising from the non-compliance;
 - 38.5 the action(s) that have or will be undertaken to mitigate any environmental harm arising from the non-compliance;
 - 38.6 corrective actions that have or will be undertaken to ensure the non-compliance does not reoccur; and
 - 38.7 if no action was taken, why no action was taken.
- 39 A non-compliance with this licence includes:
- 39.1 an exceedance of a trigger value specified in Attachment 1 on three consecutive sampling occasions; and
 - 39.2 an exceedance of a trigger value specified in Attachment 1 on a single occasion where the parameter measures greater than or equal to three times or more the trigger value.
- 40 The licensee must keep records of all exceedances of trigger values specified in Attachment 1. These records must be adequate to enable the licensee to comply with the exceedance notification conditions of this licence.
- 41 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.
- 42 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.
- 43 The licensee must ensure that each Monitoring Report:
- 43.1 is prepared in accordance with the requirements of the NT EPA 'Guideline for Reporting on Environmental Monitoring';
 - 43.2 includes a tabulation of all monitoring data required as a condition of this licence and any additional data used as part of the analysis and interpretation undertaken in the report, to be submitted in electronic Microsoft® Excel® format;
 - 43.3 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); and
 - 43.4 includes an assessment of environmental impact from the activity.
- 44 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.

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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: 14/04/2022

END NOTES

This licence is an amendment per s38(2)(b) of the WMPC Act and supersedes EPL218.

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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.
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 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.

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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.
Land	includes water and air on, above or under land.
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.
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.
Point source discharge	means any discernible, confined or discrete conveyance from which contaminants or waste are or may be discharged.
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 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.
Qualified person	A person who has professional qualifications, training or skills or experience relevant to the nominated subject matters and can give authoritative assessment, advice and analysis about performance relevant to the subject matters using relevant protocols, standards, methods or literature.
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>
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.

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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> .

Appendix F

Historical Field Data



Appendix B
Table 1 - Groundwater Gauging

Groundwater gauging

Well ID	Date/Time	Water Depth (mbTOC)	Well Depth (mbTOC)	Method	Dry	Comments	PID (ppm)
MW01	17/01/2020 12:30	-	0.78	Dip	Y	Well Dry	0.0
MW01	23/04/2020 11:21	-	0.78	Dip	Y	Well Dry	0.1
MW01	28/04/2020 10:58	-	0.78	Dip	Y	Well Dry	0.0
MW01	04/08/2020 11:58	-	0.78	Dip	Y	Well Dry	0.0
MW01	08/09/2020 10:00	-	0.77	Dip	Y	Well Dry	0.0
MW01	16/09/2020 09:33	-	0.77	Dip	Y	Well Dry	0.0
MW01	20/04/2021 13:30	-	0.78	Dip	Y	Well Dry	0.0
MW01	28/04/2021 11:44	-	0.78	Dip	Y	Well Dry	0.0
MW01	07/09/2021 11:30	-	-	Dip	Y	Well Dry	0.0
MW01	15/09/2021 11:25	-	-	Dip	Y	Well Dry	0.0
MW02	17/01/2020 12:31	0.941	1.78	Dip	N	Clear with organic matter, no odour, no sheen - Bail	0.0
MW02	23/04/2020 11:27	1.346	1.75	Dip	N	Clear, no odour, no sheen	0.0
MW02	28/04/2020 10:59	1.443	1.75	Dip	N	Clear, no odour, no sheen	0.0
MW02	04/08/2020 12:00	-	1.75	Dip	Y	Well Dry	0.0
MW02	08/09/2020 10:05	-	1.75	Dip	Y	Well Dry	0.0
MW02	16/09/2020 09:35	-	1.75	Dip	Y	Well Dry	0.0
MW02	20/04/2021 13:20	1.428	1.75	Dip	N	Insufficient water in the column to pruge and take samples	0.0
MW02	28/04/2021 11:40	1.523	1.75	Dip	N	Insufficient water in the column to pruge and take samples	0.0
MW02	07/09/2021 11:35	-	-	Dip	Y	Well Dry	0.0
MW02	15/09/2021 11:20	-	-	Dip	Y	Well Dry	0.0
MW03	17/01/2020 12:29	1.467	4.64	Dip	N	Unable to get bailer down well	0.0
MW03	23/04/2020 10:56	2.157	4.63	Dip	N	Clear, no odour, no sheen	0.1
MW03	28/04/2020 10:15	2.264	4.63	Dip	N	Clear, no odour, no sheen	1.2
MW03	04/08/2020 11:21	2.876	4.65	Dip	N	Slightly cloudy, no odour, no sheen	0.0
MW03	08/09/2020 11:37	3.040	4.64	Dip	N	Slightly cloudy, no odour, no sheen	0.0
MW03	16/09/2020 09:30	3.085	4.63	Dip	N	Pale brown cloudy, clearing up, no odour, no sheen	0.1
MW03	20/04/2021 12:56	2.690	4.64	Dip	N	Clear, no odour, no sheen, low turbidity	0.0
MW03	28/04/2021 11:50	2.789	4.68	Dip	N	Clear, no odour, no sheen, no turbidity	0.1
MW03	07/09/2021 11:55	3.248	4.64	Dip	N	High turbidity, Red/brown colour, no odour, becoming clear	0.2
MW03	15/09/2021 12:30	3.314	4.61	Dip	N	Brown-grey, medium turbidity, clearing up, no odour, no sheen.	0.2
MW04	17/01/2020 13:00	1.804	6.03	Dip	N	Orange/brown, moderate sediment load, no odour, no sheen	0.0
MW04	23/04/2020 12:07	2.081	6.07	Dip	N	Slightly cloudy/milky, no odour, no sheen	0.3
MW04	28/04/2020 11:44	1.965	6.07	Dip	N	Slightly cloudy/milky, no odour, no sheen	0.8
MW04	04/08/2020 12:05	2.605	6.03	Dip	N	Clear, no odour, no sheen	0.0
MW04	08/09/2020 11:37	-	-	Dip	N	Unable to get IP probe through bend in PVC piping. Water was white-red slightly cloudy, light sheen.	0.0
MW04	16/09/2020 11:07	2.968	5.04	Dip	N	Water slightly yellow-hazy, no odour, no sheen	0.0
MW04	20/04/2021 11:56	2.148	6.03	Dip	N	Bailer stuck in well. turbid initially (mostly due to disturbance of attempting to retrieve bailer). Yellow in colour. clearing after 0.5 L. Cloudy. low turbidity, no odour, no sheen.	3.7
MW04	28/04/2021 11:02	2.297	6.03	Dip	N	Clear, no odour, no sheen, no turbidity	1.3
MW04	07/09/2021 11:15	-	-	Dip	N	Bore blocked at ground level. High turbidity, becoming clear. No odour, no sheen	0.0
MW04	15/09/2021 11:30	2.870	5.09	Dip	N	SWL and Bore depth measured through gap in broken casing at ground level. Clear, no turbidity, H2S odour, no sheen	0.0
MW05	17/01/2020 13:30	3.325	5.48	Dip	N	Brown, slightly turbid, no odour. no sheen - Bailer	0.0
MW05	23/04/2020 13:08	3.759	5.47	Dip	N	Clear, no odour, no sheen	0.0
MW05	28/04/2020 12:40	3.781	5.47	Dip	N	Clear, no odour, no sheen	0.1
MW05	04/08/2020 12:48	3.809	5.48	Dip	N	Clear, no odour, no sheen	0.0
MW05	08/09/2020 12:11	3.932	5.47	Dip	N	Clear, no odour, no sheen	0.0
MW05	16/09/2020 09:20	3.854	4.47	Dip	N	Clear, no odour, no sheen	0.0
MW05	20/04/2021 11:26	3.921	5.47	Dip	N	Clear, no odour, no sheen, no turbidity	0.2
MW05	28/04/2021 10:30	3.656	5.46	Dip	N	Clear, no odour, no sheen, no turbidity	0.2
MW05	07/09/2021 10:40	5.061	5.47	Dip	N	High turbidity Initially - Brown in colour, clearing up	0.2
MW05	15/09/2021 10:50	5.185	5.48	Dip	N	Low turbidity, no odour, no sheen, then clearing up	1.1
MW06	17/01/2020 14:10	3.468	6.60	Dip	N	Cloudy brown, moderate sediment load, no odour, no sheen - Bailer	0.2
MW06	23/04/2020 09:03	4.376	6.61	Dip	N	Clear, no odour, no sheen	0.0
MW06	28/04/2020 08:47	4.418	6.61	Dip	N	Clear, no odour, no sheen	0.8
MW06	04/08/2020 08:52	5.244	6.60	Dip	N	Clear, no odour, no sheen	0.0
MW06	08/09/2020 12:55	5.481	6.58	Dip	N	Clear, no odour, no sheen	0.0
MW06	16/09/2020 09:15	3.824	6.60	Dip	N	Clear, no odour, no sheen	0.0
MW06	20/04/2021 10:47	4.405	6.59	Dip	N	High turbidity initially, cleared after 200ml (tubing at base of well, then raised up higher). Clear, no odour, no sheen, no turbidity	0.2
MW06	28/04/2021 09:00	4.540	6.53	Dip	N	Cloudy (yellowish brown), no odour, no sheen, low turbidity. Clear by 0.5 L	0.2
MW06	07/09/2021 12:30	5.570	6.20	Dip	N	High turbidity - red/brown colour. Becoming clear	0.2
MW06	15/09/2021 09:37	5.624	6.64	Dip	N	Orange, very high turbidity, no odour, no sheen. Then high turbidity	0.8
MW07	17/01/2020 10:40	2.529	6.04	Dip	N	Bore bent, unable to get bailer down well	0.5
MW07	23/04/2020 10:01	2.869	6.05	Dip	N	Clear, no odour, no sheen	0.8
MW07	28/04/2020 09:36	2.984	6.05	Dip	N	Clear, no odour, no sheen	0.1
MW07	04/08/2020 10:02	3.605	6.03	Dip	N	Clear, no odour, no sheen	0.0
MW07	16/09/2020 09:02	3.824	6.05	Dip	N	Clear, no odour, no sheen	0.1
MW07	20/04/2021 09:55	2.948	6.04	Dip	N	Clear, no odour, no sheen, no turbidity	0.6
MW07	28/04/2021 09:44	3.053	6.04	Dip	N	Clear, no odour, no sheen, no turbidity	0.3
MW07	08/09/2020 13:42	3.774	6.01	Dip	N	Clear, no odour, no sheen	0.0
MW07	07/09/2021 09:40	3.554	6.05	Dip	N	Clear, no turbidity, no odour, no sheen	0.1
MW07	15/09/2021 08:25	3.635	6.04	Dip	N	Clear, no turbidity, no odour, no sheen	0.0



Appendix B
Table 2 - Stabilisation Results

Darwin Turf Club
EPL Monitoring

Stabilisation Results

Well ID	Sampled Date/Time	Time	Purge Vol. (L)	Purge SWL (mbTOC)	pH Field (pH Units)	EC Field (µS/cm)	DO Field (mg/L)	DO Field (%S)	OPR Field (mV)	Temp Field (°C)	Turbidity Field (NTU)
MW02	17/01/2020 12:59	12:36:00	1.0	0.951	6.28	609	0.81	11.4	-33.8	33.1	-
		12:38:00	2.0	0.959	6.18	647	0.81	11.5	-31.0	33.9	-
		12:40:00	3.0	0.959	6.08	506	1.33	29.3	-20.7	34.8	-
		12:42:00	4.0	0.959	5.89	498.6	1.91	27.7	1.4	34.8	-
		12:45:00	5.0	0.959	5.84	510	1.91	27.6	10.3	34.8	-
		12:47:00	6.0	0.959	5.86	505	1.87	27.4	11.3	34.8	-
MW02	23/04/2020 11:45	11:35:06	0.5	1.530	6.04	520	1.26	17.9	42.2	34.3	54.67
		11:37:34	1.0	1.483	5.85	531	0.83	11.8	41.2	34.8	29.10
		11:40:35	1.5	1.472	5.56	535	0.41	6.0	59.2	34.8	2.13
		11:42:30	2.0	1.472	5.51	531	0.38	5.4	65.7	34.8	0.39
		11:45:09	2.5	1.472	5.46	528	0.37	5.6	68.0	34.8	0.00
MW02	28/04/2020 11:29	11:09:43	0.5	1.563	5.78	520	1.23	17.1	44.4	33.9	12.00
		11:13:06	1.0	1.520	5.58	510	0.83	11.8	54.9	34.2	4.70
		11:17:20	1.5	1.515	5.52	504	0.60	8.5	66.3	34.2	0.00
		11:21:16	2.0	1.516	5.50	497.5	0.59	8.3	74.7	34.2	0.00
		11:25:16	2.5	1.519	5.47	492.3	0.58	8.3	80.8	34.2	0.00
		11:29:08	3.0	1.521	5.45	490.1	0.59	8.3	84.1	34.2	0.00
MW03	23/04/2020 11:10	11:04:51	0.5	2.158	4.73	581	0.88	12.4	206.9	34.0	22.5
		11:06:38	1.0	2.158	4.75	584	0.93	13.2	209.8	34.0	22.09
		11:08:30	1.5	2.158	4.76	582	0.93	13.2	209.8	34.0	21.61
		11:10:24	2.0	2.158	4.76	582	0.93	13.2	209.4	34.0	20.90
MW03	28/04/2020 10:36	10:23:55	0.5	2.264	4.61	588	0.75	10.4	236.0	33.9	0.00
		10:26:21	1.0	2.264	4.63	588	0.53	7.4	236.2	33.8	0.00
		10:29:49	1.5	2.264	4.66	587	0.40	5.5	236.6	33.8	0.00
		10:32:34	2.0	2.264	4.65	587	0.37	5.2	237.2	33.8	0.00
		10:36:02	2.5	2.264	4.67	586	0.36	5.0	236.7	33.8	0.00
MW03	04/08/2020 11:46	11:36:08	0.5	2.877	5.05	437.0	0.95	13.4	205.4	32.9	33.42
		11:39:03	1.0	2.877	5.03	408.2	0.42	5.8	218.1	32.9	22.22
		11:41:38	1.5	2.877	5.03	406.7	0.34	4.8	221.8	32.8	15.25
		11:43:47	2.0	2.877	5.03	406.4	0.28	3.9	226.1	32.8	10.10
		11:45:25	2.5	2.878	5.02	406.3	0.28	3.8	227.9	32.8	9.310
		11:47:13	3.0	2.878	5.02	406.4	0.29	4.0	229.0	32.8	9.56
MW03	08/09/2020 10:28	10:28:00	1.0	3.046	4.86	417.3	0.25	3.7	206.1	33.5	6.07
		10:33:00	2.0	3.045	4.84	419.1	0.00	0.0	203.7	33.5	15.01
		10:38:00	3.0	3.049	4.79	423.3	0.00	0.0	202.0	33.5	3.80
		10:42:00	4.0	3.049	4.79	423.5	0.00	0.0	200.3	33.5	2.06
		10:46:00	5.0	3.048	4.80	422	0.00	0.0	201.9	33.7	0.54
		10:48:00	6.0	3.048	4.80	422.9	0.00	0.0	201.4	33.7	0.89
		10:53:00	7.0	3.049	4.81	422.8	0.00	0.0	202.1	33.6	1.00
MW03	16/09/2020 10:08	09:50:00	0.1	3.082	6.00	960	14.30	0.98	-9.3	33.3	2184.11
		09:54:00	0.5	3.083	5.76	921	0.00	0.0	-8.3	33.9	911.17
		09:57:00	1.0	3.085	5.62	896	0.00	0.0	-1.8	34.0	489.0
		10:01:00	1.5	3.085	5.59	491	0.00	0.0	1.0	33.8	2460
		10:03:00	2.0	3.085	5.59	510	0.00	0.0	0.6	34.0	2301
		10:06:00	2.5	3.085	5.60	529	0.00	0.0	-0.2	33.9	2197
MW03	20/04/2021 13:15	01:04:00	0.5	4.695	5.25	492.0	0.09	1.2	166.1	32.8	0.98
		01:06:00	1.0	4.696	5.22	488.7	0.07	0.9	171.5	32.9	1.00
		01:08:00	1.5	4.696	5.19	483.6	0.05	0.7	179.8	32.8	0.86
		01:10:00	2.0	4.696	5.20	484.0	0.04	0.5	181.2	32.8	0.73
		01:12:00	2.5	4.696	5.22	481.1	0.03	0.5	183.2	32.8	0.79
MW03	28/04/2021 12:15	11:58:07	0.5	2.791	5.52	781	1.39	19.8	177.2	33.0	0.08
		12:02:07	1.0	2.792	5.30	512	0.28	4.0	184.2	32.8	1.21
		12:04:07	1.5	2.792	5.22	499.3	0.19	2.6	193.5	32.8	1.49
		12:06:07	2.0	2.793	5.20	497.1	0.11	1.5	198.9	32.8	1.64
		12:08:07	2.5	2.793	5.21	493.9	0.07	0.9	201.3	32.8	1.72
		12:10:07	3.0	2.793	5.21	492.3	0.06	0.8	203.2	32.8	1.76
		12:12:07	3.5	2.793	5.21	491.5	0.06	0.8	204.2	32.8	1.80
MW03	07/09/2021 11:55	11:55:00	0.5	3.258	6.41	563	0.24	3.3	29.3	32.7	2037
		12:00:00	1.0	3.259	6.21	551	0.23	3.2	54.3	32.3	759.0
		12:05:00	1.5	3.260	6.02	545	0.27	3.7	81.2	32.1	342.65
		12:10:00	2.0	3.251	5.89	547	0.31	4.3	107.4	32.2	107.66
		12:15:00	2.5	3.252	5.88	543	0.23	3.1	126.5	32.1	70.70
		12:20:00	3.0	3.252	5.86	544	0.21	3.0	131.3	32.1	58.77
		12:25:00	3.5	3.260	5.85	545	0.22	2.9	133.6	32.1	66.11
MW03	15/09/2021 12:30	12:30:00	0.5	3.316	6.41	583	0.30	4.3	48.9	33.4	-
		12:35:00	1.0	3.316	6.17	527	0.28	4.0	68.7	33.4	-
		12:40:00	1.5	3.316	6.01	502	0.23	3.3	91.8	33.4	-
		12:45:00	2.0	3.316	6.17	495.1	0.18	2.5	76.7	33.3	-
		12:50:00	2.5	3.316	6.09	491	0.19	2.6	79.6	33.5	-
		12:55:00	3.0	3.316	6.01	487.6	0.20	2.7	86.9	33.5	-
		13:00:00	3.0	3.316	5.98	487.4	0.20	2.9	93.7	33.5	-



Appendix B
Table 2 - Stabilisation Results

Darwin Turf Club
EPL Monitoring

Well ID	Sampled Date/Time	Time	Purge Vol. (L)	Purge SWL (mbTOC)	pH Field (pH Units)	EC Field (µS/cm)	DO Field (mg/L)	DO Field (%S)	OPR Field (mV)	Temp Field (°C)	Turbidity Field (NTU)
MW04	17/01/2020 13:20	13:03:00	1.0	2.174	5.41	9691	4.08	56.8	126.9	31.7	-
		13:05:00	2.0	-	5.34	10356	4.17	59.5	137.8	31.8	-
		13:07:00	3.0	2.566	5.06	15173	3.12	45.4	156.6	32.0	-
		13:09:00	4.0	-	4.99	17340	2.05	31.9	187.3	32.3	-
		13:12:00	6.0	2.830	4.99	13930	2.03	31.0	189.3	32.3	-
		13:15:00	8.0	-	5.06	13225	2.07	32.4	189.3	32.3	-
		13:18:00	10.0	-	5.09	13025	2.09	32.4	191.7	32.3	-
		13:20:00	11.0	-	5.11	12521	2.06	32.1	193.3	32.3	-
MW04	23/04/2020 12:41	12:26:40	0.5	1.949	4.83	13350	1.59	23.1	214.6	33.7	87.86
		12:28:49	1.0	1.963	4.97	11288	1.51	21.9	217.4	33.6	85.43
		12:30:50	1.5	1.965	5.05	9530	1.51	21.8	217.5	33.6	85.32
		12:32:28	2.0	1.964	5.08	7500	1.48	21.2	217.3	33.6	85.47
		12:36:24	3.0	1.964	5.18	6430	1.44	20.7	215.4	33.6	53.69
		12:39:04	3.5	1.965	5.20	6366	1.46	20.8	214.2	33.6	50.41
		12:41:01	4.0	1.966	5.23	6273	1.41	20.1	213.1	33.6	46.79
MW04	28/04/2020 12:24	11:55:39	0.5	2.037	4.47	23696	0.63	9.4	237.4	33.2	13.14
		11:58:45	1.0	2.037	4.59	23663	0.53	8.0	246.7	33.3	4.81
		12:02:58	1.5	2.037	4.71	19250	0.57	8.4	251.7	33.3	3.00
		12:06:01	2.0	2.037	4.73	15003	0.62	9.0	249.4	33.3	0.92
		12:09:37	2.5	2.037	4.86	11724	0.69	9.9	245.9	33.3	1.68
		12:12:02	3.0	2.037	4.99	9581	0.78	11.2	241.1	33.3	2.52
		12:15:07	3.5	2.037	5.03	8491	0.82	11.8	237.8	33.3	3.31
		12:18:21	4.0	2.037	5.10	7352	0.93	13.3	234.6	33.3	3.55
		12:20:28	4.5	2.037	5.13	6922	0.95	13.6	232.8	33.3	3.97
		12:22:18	5.0	2.037	5.15	6875	0.98	14.0	231.0	33.3	4.95
		12:24:03	5.5	2.037	5.18	6729	1.04	14.8	229.2	33.3	5.06
MW04	04/08/2020 12:34	12:15:11	0.50	2.753	4.86	16623	2.13	30.2	294.8	32.0	4.01
		12:18:32	1.0	2.796	4.98	13810	2.24	32.1	300.0	31.9	3.62
		12:21:06	1.5	2.834	4.96	13554	1.44	20.5	303.1	31.9	4.35
		12:23:43	2.0	2.875	5.01	12026	1.06	15.1	304.1	31.9	4.06
		12:25:26	2.5	2.888	5.05	11123	0.88	12.3	303.8	31.9	4.13
		12:27:10	3.0	2.897	5.07	10237	0.85	12.0	303.9	31.9	4.18
		12:30:13	3.5	2.899	5.09	10062	0.81	11.6	302.6	31.9	4.25
		12:32:51	4.0	2.899	5.11	9850	0.80	11.3	302.6	31.9	4.56
MW04	08/09/2020 11:39	11:18:00	0.1	-	4.59	19058	0.84	12.8	235.1	33.3	330.90
		11:21:00	1.0	-	4.61	18855	0.32	4.9	238.9	32.7	281.90
		11:25:00	2.0	-	4.63	18863	0.25	3.7	243.5	32.6	38.90
		11:30:00	3.0	-	4.45	18450	0.15	2.2	146.4	32.6	385.10
		11:34:00	4.0	-	4.65	18610	0.17	2.8	247.8	32.5	299.30
		11:37:00	5.0	-	4.65	18810	0.17	2.8	247.2	32.5	301.90
MW04	16/09/2020 11:07	10:45:00	0.1	3.039	4.49	21623	7.70	0.5	213.0	33.3	30.72
		10:47:00	0.5	3.115	4.49	21250	3.30	0.20	221.7	33.4	52.41
		10:50:00	1.0	3.186	4.49	21233	-1.10	-0.08	224.9	33.1	80.71
		10:55:00	1.5	3.218	4.51	21436	-1.70	-0.12	226.0	33.9	62.13
		10:58:00	2.0	3.244	4.51	21031	-2.30	-0.16	225.3	33.2	90.10
		11:01:00	2.5	3.307	4.52	20977	-2.50	-0.18	224.9	33.2	76.10
		11:05:00	3.0	3.376	4.52	20888	-2.39	-0.16	225.9	33.2	63.10
MW04	20/04/2021 12:20	12:04:00	0.5	2.259	5.41	14928	3.53	51.9	167.2	33.4	255.0
		12:07:00	1.0	2.269	5.31	14811	2.71	39.6	162.6	33.4	360.0
		12:11:00	1.5	2.272	5.36	13138	2.37	34.3	158.8	33.5	109.0
		12:13:00	2.0	2.275	5.47	9833	2.36	34.2	150.7	33.5	0.17
		12:15:00	2.5	2.277	5.52	8487	2.09	30.1	148.9	33.5	0.22
		12:16:00	3.0	2.287	5.57	7300	1.91	27.3	147.1	33.5	0.33
		12:18:00	3.5	2.283	5.59	7111	1.90	27.1	146.8	33.5	0.54
		12:20:00	4.0	2.280	5.63	7055	1.89	26.8	145.9	33.5	0.83
MW04	28/04/2021 11:30	11:07:00	0.5	2.385	4.72	23371	0.47	7.0	254.1	33.1	1.21
		11:12:00	1.0	2.408	4.94	20870	0.61	9.0	252.5	33.1	1.84
		11:14:00	1.5	2.404	4.99	20404	0.59	8.8	252.5	33.2	1.88
		11:16:00	2.0	2.401	5.03	19232	0.55	8.0	251.3	33.2	1.79
		11:18:00	2.5	2.411	5.20	14750	0.99	14.4	244.8	33.2	1.82
		11:20:00	3.0	2.406	5.27	12930	1.17	16.8	241.1	33.2	1.74
		11:24:00	3.5	2.408	5.47	8822	1.57	21.5	233.2	33.2	1.77
		11:26:00	4.0	2.409	5.49	8901	1.41	20.1	232.5	33.2	1.67
		11:28:00	4.5	2.408	5.53	8828	1.42	20.2	229.3	33.2	1.63
MW04	07/09/2021 11:15	11:20:00	0.2	-	5.24	24395	0.73	10.7	70.4	32.1	0.61
		11:25:00	0.4	-	5.32	24799	0.57	8.3	41.9	32.1	0.40
		11:30:00	0.6	-	5.54	24975	0.33	5.1	2.3	32.1	0.00
		11:35:00	0.8	-	5.59	24992	0.31	4.8	-3.8	32.1	0.00
		11:40:00	1.0	-	5.61	24995	0.28	4.5	-6.0	32.1	0.00
		11:45:00	1.2	-	5.73	24974	0.25	4.0	-9.1	32.2	0.00
MW04	15/09/2021 11:40	11:40:56	0.5	2.070	5.59	22187	0.48	7.2	-25.6	32.6	-
		11:45:36	1.0	2.085	5.61	22165	0.45	6.8	-37.0	32.5	-
		11:50:00	1.5	2.097	5.61	22137	0.44	6.5	-47.0	32.7	-
		11:55:00	2.0	2.119	5.62	22110	0.42	6.3	-53.44	32.6	-
		12:00:00	2.5	2.13	5.63	22088	0.39	5.7	-60.9	32.6	-



Appendix B
Table 2 - Stabilisation Results

Darwin Turf Club
EPL Monitoring

Well ID	Sampled Date/Time	Time	Purge Vol. (L)	Purge SWL (mbTOC)	pH Field (pH Units)	EC Field (µS/cm)	DO Field (mg/L)	DO Field (%S)	OPR Field (mV)	Temp Field (°C)	Turbidity Field (NTU)
MW05	17/01/2020 13:50	13:35:00	2.0	3.705	6.64	157.8	4.65	56.6	143.0	31.1	-
		13:37:00	3.0	3.870	6.60	116.0	4.49	61.0	145.2	31.1	-
		13:39:00	4.0	4.021	5.97	115.0	4.48	66.7	148.5	31.2	-
		13:40:00	5.0	4.121	5.95	110.2	4.52	69.3	150.2	31.2	-
		13:42:00	6.0	4.252	5.93	107.3	4.56	69.3	153.5	31.2	-
MW05	23/04/2020 13:28	13:18:41	0.5	3.902	5.67	126.5	6.05	83.6	185.2	32.5	1.06
		13:20:39	1.0	3.961	5.65	102.5	6.05	83.5	190.5	32.5	1.04
		13:22:24	1.5	4.018	5.62	96.2	6.03	83.2	195.7	32.5	0.0
		13:25:34	2.0	4.077	5.60	95.1	5.95	82.2	201.9	32.5	0.0
		13:28:09	2.5	4.151	5.59	95.1	5.92	81.7	205.4	32.5	0.0
MW05	28/04/2020 13:14	12:51:41	0.5	3.915	5.80	152.0	6.23	85.9	181.4	32.4	0.0
		12:54:01	1.0	3.974	5.77	102.3	6.24	86.0	191.0	32.4	0.0
		12:58:40	1.5	4.064	5.73	92.8	6.22	85.6	198.9	32.4	0.0
		13:03:09	2.0	4.147	5.71	91.5	6.21	85.7	207.5	32.4	0.0
		13:08:41	2.5	4.226	5.68	91.5	6.27	86.6	211.6	32.4	0.0
		13:14:03	3.0	4.303	5.67	93.6	6.16	85.3	217.1	32.4	0.0
MW05	04/08/2020 13:08	12:57:58	0.5	3.944	6.36	184.5	7.09	95.4	251.8	31.0	2.08
		13:01:10	1.0	4.063	6.30	79.0	7.13	95.9	258.8	31.0	2.20
		13:03:51	1.2	4.112	6.29	78.30	7.13	95.9	260.3	31.0	2.24
		13:05:27	1.5	4.177	6.28	77.40	7.11	95.7	262.4	31.0	2.26
MW05	08/09/2020 12:11	11:58:00	0.1	3.978	6.05	288.6	7.01	98.4	150.6	33.5	2.17
		12:03:00	1.0	4.285	5.96	102.1	6.84	94.3	165.1	32.3	4.11
		12:07:00	2.0	4.310	5.96	109.8	6.83	92.0	167.0	32.3	4.81
		12:11:00	3.0	4.323	5.96	112.0	6.79	89.1	171.0	32.3	4.86
MW05	16/09/2020 11:46	11:26:00	0.1	3.934	6.11	161.7	6.69	97.1	107.0	33.6	0.92
		11:30:00	0.5	4.089	6.10	96.8	6.67	96.0	121.1	32.4	0.15
		11:35:00	1.0	4.141	6.09	97.7	6.95	96.7	119.8	33.1	2.90
		11:40:00	1.5	4.198	6.04	103.0	6.81	95.9	114.3	33.1	1.80
		11:44:00	2.0	4.219	6.04	110.4	6.95	96.8	116.9	33.1	1.27
MW05	20/04/2021 11:40	11:28:00	0.5	4.010	5.04	229.9	3.83	52.7	202.6	32.3	2.01
		11:30:00	1.0	4.140	4.90	228.6	4.08	56.3	223.8	32.1	2.12
		11:32:00	1.5	4.261	4.86	227.0	3.94	54.1	234.1	32.1	2.11
		11:34:00	2.0	4.364	4.87	230.9	3.72	51.1	238.0	32.2	2.08
		11:36:00	2.5	4.404	4.89	230.5	3.76	51.8	241.4	32.3	1.96
MW05	28/04/2021 10:50	10:37:00	0.5	3.835	5.82	101.6	6.25	85.1	204.8	31.7	5.30
		10:41:00	1.0	3.879	5.72	98.8	6.19	84.5	207.2	31.7	4.40
		10:43:00	1.5	3.972	5.66	97.9	5.96	81.4	210.2	31.8	0.60
		10:45:00	2.0	4.023	5.66	98.9	5.93	80.8	211.5	31.8	0.66
		10:47:00	2.5	4.076	5.66	99.4	5.91	80.7	212.6	31.8	0.67
MW05	07/09/2021 10:50	10:55:00	0.2	5.061	6.72	99.9	5.88	78.7	142.0	30.6	1191.81
		11:00:00	0.4	5.125	6.7	99.3	5.84	78.1	147.7	30.5	1011.82
		11:05:00	0.6	5.177	6.66	98.8	5.85	78.2	152.0	30.6	810.81
		11:10:00	0.8	5.191	6.64	96.4	5.88	78.4	160.1	30.6	330.31
		11:15:00	1.0	5.212	6.61	96.6	5.87	78.4	161.2	30.6	356.14
MW05	15/09/2021 10:55	10:55:00	0.5	5.205	6.49	87.1	6.39	86.5	141.1	31.3	-
		11:00:00	1.0	5.256	6.44	86.0	6.18	83.5	144.9	31.3	-
		11:05:00	1.5	5.361	6.39	86.0	6.23	84.0	150.1	31.3	-
		11:10:00	2.0	5.362	6.39	85.8	6.24	83.6	151.2	31.3	-



Appendix B
Table 2 - Stabilisation Results

Darwin Turf Club
EPL Monitoring

Well ID	Sampled Date/Time	Time	Purge Vol. (L)	Purge SWL (mbTOC)	pH Field (pH Units)	EC Field (µS/cm)	DO Field (mg/L)	DO Field (%S)	OPR Field (mV)	Temp Field (°C)	Turbidity Field (NTU)
MW06	17/01/2020 14:30	14:12:14	1.0	3.492	5.44	197.5	4.47	62.4	165.1	32.5	-
		14:13:04	2.0	3.495	5.15	203.0	4.30	62.0	189.9	32.4	-
		14:14:14	3.0	3.498	5.10	210.6	4.48	62.8	203.3	32.5	-
		14:15:24	4.0	3.502	5.08	220.7	4.41	61.9	211.6	32.5	-
		14:16:36	5.0	3.505	5.07	227.3	4.29	57.8	218.6	32.5	-
		14:17:53	6.0	3.510	5.05	232.2	4.28	60.0	221.5	32.5	-
MW06	23/04/2020 09:33	09:19:23	0.5	4.380	4.68	356.1	1.76	23.2	169.1	33.2	0.00
		09:22:45	1.0	4.381	4.64	355.0	0.74	10.2	186.8	33.0	0.00
		09:24:58	1.5	4.381	4.64	354.4	0.51	7.1	192.0	33.0	0.00
		09:27:38	2.0	4.381	4.63	353.2	0.43	6.2	198.5	33.0	0.00
		09:29:24	2.5	4.381	4.63	353.4	0.37	5.2	202.0	33.0	0.00
		09:31:28	3.0	4.382	4.64	353.3	0.36	5.0	205.4	33.0	0.00
		09:33:22	3.5	4.382	4.63	353.4	0.34	4.7	208.1	33.0	0.00
MW06	28/04/2020 09:11	08:58:36	0.5	4.422	4.71	291.5	0.63	8.7	156.7	32.1	0.46
		09:02:30	1.0	4.422	4.70	289.0	0.48	6.4	176.8	32.3	0.49
		09:05:56	1.5	4.423	4.69	289.8	0.36	5.0	192.1	32.4	0.69
		09:08:24	2.0	4.423	4.69	290.5	0.35	4.9	195.9	32.4	1.10
		09:11:27	2.5	4.423	4.69	290.9	0.33	4.6	201.9	32.4	1.56
MW06	04/08/2020 09:35	09:11:00	0.5	5.436	4.63	102.4	0.52	7.1	255.7	31.7	5.20
		09:17:00	1.0	5.565	4.65	102.3	0.43	5.9	268.2	31.7	10.54
		09:23:00	1.2	5.643	4.64	106.7	0.45	6.1	275.3	31.7	10.85
		09:27:00	1.5	5.683	4.62	107.9	0.44	6.0	280.1	31.7	10.95
		09:31:00	1.7	5.763	4.61	109.8	0.42	5.9	283.1	31.7	11.02
MW06	08/09/2020 12:58	12:41:00	0.1	5.625	4.32	107.4	1.91	27.7	220.0	35.3	12.21
		12:47:00	1.0	5.759	4.36	104.5	0.61	8.6	246.5	33.9	8.16
		12:49:00	1.5	5.750	4.35	106.1	0.60	7.9	251.3	33.7	8.01
		12:52:00	2.0	5.749	4.35	108.5	0.57	7.8	249.0	33.5	7.92
		12:55:00	2.5	5.745	4.35	107.9	0.57	7.7	245.1	33.5	7.94
MW06	16/09/2020 12:27	11:57:08	0.1	5.657	4.39	100.1	23.1	1.5	213.1	35.1	5.10
		11:57:40	0.5	5.758	4.38	91.7	26.6	1.8	223.8	35.2	59.11
		11:57:43	1.0	5.844	4.38	99.3	22.6	1.5	242.1	34.4	69.10
		11:57:46	1.5	5.939	4.35	96.1	18.7	1.3	241.0	34.0	49.80
		11:57:49	2.0	5.981	4.32	97.8	19.0	1.4	236.7	34.0	30.19
		11:57:52	2.5	6.028	4.32	103.9	20.2	1.4	249.8	34.1	12.10
MW06	20/04/2021 11:08	10:56:00	1.0	4.408	5.07	349.4	1.28	17.5	173.8	31.7	233.67
		10:58:00	1.5	4.408	4.99	353.8	1.13	15.5	183.3	31.6	0.57
		11:00:00	2.0	4.408	4.96	355.0	0.84	11.8	192.9	31.6	1.60
		11:02:00	2.5	4.408	4.93	356.4	0.78	10.7	200.0	31.6	1.85
		11:04:00	3.0	4.409	4.91	356.6	0.60	8.5	207.3	31.6	1.95
		11:06:00	3.5	4.409	4.91	355.8	0.53	7.5	211.0	31.6	1.96
		11:08:00	4.0	4.410	4.90	355.0	0.52	7.4	215.5	31.6	1.87
MW06	28/04/2021 09:22	09:10:36	0.5	4.545	4.89	345.5	0.42	5.7	198.6	31.0	2.02
		09:12:52	1.0	4.547	4.89	338.5	0.28	3.7	206.0	31.2	2.16
		09:14:48	1.5	4.547	4.96	338.6	0.21	2.8	209.1	31.2	2.17
		09:16:23	2.0	4.547	4.97	338.5	0.14	1.8	214.4	31.2	2.17
		09:18:05	2.5	4.547	4.97	337.8	0.13	1.8	217.2	31.2	2.16
		09:20:42	3.0	4.547	4.97	338.3	0.13	1.8	219.9	31.2	2.10
MW06	07/09/2021 12:40	12:40:00	0.2	5.725	6.09	109.7	1.40	19.4	175.1	32.4	659.75
		12:45:00	0.4	5.78	5.75	109.7	1.30	18.0	187.1	32.7	639.30
		12:50:00	0.6	5.885	5.74	106.9	1.17	15.8	167.3	32.5	803.00
		12:55:00	0.8	6.068	5.62	109.2	1.51	20.5	190.8	32.4	202.68
		13:00:00	1.0	6.070	5.58	110.9	1.62	22.2	198.2	32.3	181.25
		13:05:00	1.2	6.070	5.60	111.3	1.51	20.8	195.5	32.4	395.50
MW06	15/09/2021 09:40	09:40:00	0.5	5.633	6.23	95.5	1.54	21.3	139.4	32.6	-
		09:45:00	1.0	5.691	6.08	94.5	1.59	22.0	145.6	32.5	-
		09:50:03	1.5	5.727	5.88	93.2	1.66	22.9	156.2	32.3	-
		09:55:00	2.0	5.768	5.72	92.3	1.68	23.2	165.1	32.4	-
		10:00:00	2.5	5.792	5.58	91.9	1.65	22.6	179.2	32.3	-
		10:05:00	3.0	5.806	5.56	91.7	1.66	22.9	181.1	32.2	-
		10:10:00	3.5	5.821	5.57	94.1	1.64	22.6	181.6	32.1	-
		10:15:00	4.0	5.837	5.56	94.7	1.63	22.6	181.9	32.3	-



Appendix B
Table 2 - Stabilisation Results

Darwin Turf Club
EPL Monitoring

Well ID	Sampled Date/Time	Time	Purge Vol. (L)	Purge SWL (mbTOC)	pH Field (pH Units)	EC Field (µS/cm)	DO Field (mg/L)	DO Field (%S)	OPR Field (mV)	Temp Field (°C)	Turbidity Field (NTU)
MW07	23/04/2020 10:17	10:08:37	0.5	2.921	4.31	195.3	2.53	34.1	208.8	31.3	0.30
		10:10:15	1.0	2.930	4.27	176.6	2.45	32.9	218.9	31.1	0.31
		10:12:33	1.5	2.931	4.26	176.1	2.27	30.6	226.9	31.1	0.00
		10:15:08	2.0	2.932	4.25	177.7	2.35	31.6	232.0	31.1	-0.90
		10:17:05	2.5	2.932	4.24	176.4	2.32	31.3	236.0	31.1	0.00
MW07	28/04/2020 09:53	09:43:53	0.5	3.021	4.21	317.5	1.41	19.2	238.3	31.1	0.00
		09:46:04	1.0	3.022	4.22	212.0	1.93	26.1	244.1	31.1	0.00
		09:48:49	1.5	3.022	4.19	188.6	2.10	28.3	250.9	31.1	0.00
		09:50:54	2.0	3.023	4.18	186.9	2.10	28.3	254.2	31.1	0.00
		09:53:01	2.5	3.023	4.17	186.4	2.00	28.3	256.7	31.1	0.00
MW07	04/08/2020 10:48	10:21:28	0.5	3.760	4.65	1500	1.27	17.1	208.0	30.7	8.33
		10:27:42	1.0	3.846	4.74	1451	1.24	17.1	226.1	30.8	8.75
		10:33:24	1.5	3.931	4.75	1877	1.25	17.7	194.4	30.8	9.28
		10:39:55	2.0	4.095	4.79	1722	0.45	6.1	170.7	30.8	6.29
		10:43:33	2.5	4.193	4.82	1693	0.48	6.4	178.5	30.8	6.12
		10:47:12	3.0	4.264	4.81	1651	0.48	6.5	179.9	30.8	6.66
MW07	08/09/2020 13:43	13:33:00	0.1	3.891	4.57	2855	1.89	25	100.1	36.0	36.50
		13:35:00	0.5	4.150	4.53	2541	0.09	1.4	186.9	32.7	35.10
		13:37:00	1.0	4.071	4.53	2561	0.08	1.3	187.1	32.5	35.91
		13:40:00	1.5	4.103	4.52	2614	0.09	1.3	186.1	32.5	36.09
		13:42:00	2.0	4.121	4.53	2599	0.08	1.3	179.0	32.5	35.96
MW07	16/09/2020 13:26	11:59:42	0.1	3.914	4.24	2114	14.6	1.0	227.9	34.0	14.10
		12:00:16	0.5	4.050	4.07	1727	16.6	1.2	264.4	32.9	18.57
		12:00:20	1.0	4.138	4.07	1617	22.5	1.6	275.0	32.7	21.19
		12:00:23	1.5	4.198	4.07	1691	24.1	1.6	218.1	32.7	16.18
		13:24:00	2.0	4.263	4.07	1710	25.6	1.7	247.1	32.7	20.11
MW07	20/04/2021 10:32	10:12:39	0.5	3.007	5.12	2272	0.35	4.9	90.1	30.5	2.06
		10:14:09	1.0	3.019	4.97	1844	0.16	2.2	109.2	30.4	2.07
		10:16:42	1.5	3.024	4.83	1533	0.13	1.7	127.9	30.4	2.10
		10:18:18	2.0	3.027	4.64	1085	0.25	3.3	146.5	30.4	2.14
		10:20:23	2.5	3.030	4.59	692.0	0.66	8.4	158.2	30.4	2.16
		10:22:18	3.0	3.032	4.54	307.8	1.45	19.2	176.6	30.3	2.17
		10:24:14	3.5	3.034	4.49	283.9	1.53	20.3	191.4	30.3	2.18
		10:26:29	4.0	3.036	4.47	273.8	1.54	20.5	196.3	30.3	2.18
		10:28:06	4.5	3.037	4.46	281.8	1.54	20.5	199.9	30.3	2.18
MW07	28/04/2021 10:10	09:50:34	0.5	3.111	4.91	1729	1.56	21.3	184.9	30.2	1.96
		09:52:25	1.0	3.137	4.78	1633	0.25	3.4	183.9	30.4	2.10
		09:55:02	1.5	3.195	4.49	985.0	0.28	3.7	210.4	30.4	2.15
		09:58:41	2.0	3.228	4.48	620.0	0.74	9.5	219.1	30.4	2.14
		10:00:39	2.5	3.295	4.47	319.5	1.71	22.7	227.1	30.4	2.15
		10:02:24	3.0	3.329	4.45	324.7	2.22	29.0	229.2	30.4	2.14
		10:04:21	3.5	3.371	4.44	330.1	2.30	30.0	231.5	30.4	2.15
		10:06:36	4.0	3.399	4.45	331.4	2.32	31.6	233.5	30.4	2.14
MW07	07/09/2021 09:40	09:55:00	0.2	3.771	5.88	3096	1.97	22.2	58.6	30.0	21.03
		10:00:00	0.4	3.773	5.74	3005	0.59	7.8	88.1	30.2	23.59
		10:05:00	0.6	3.801	5.75	2676	0.38	5.1	116.2	30.2	21.79
		10:10:00	0.8	4.030	5.56	2404	0.43	5.8	157.0	30.1	11.32
		10:15:00	1.0	4.350	5.30	2178	1.20	16.0	226.8	30.2	5.59
		10:20:00	1.2	4.358	5.46	2262	0.90	11.9	210.4	30.2	2.22
		10:25:00	1.4	4.359	5.45	2260	0.88	11.8	210.2	30.2	2.31
		10:30:00	1.6	4.361	5.46	2261	0.89	11.9	210.5	30.2	2.30
MW07	15/09/2021 08:30	08:30:00	0.5	3.829	5.26	2974	0.87	11.6	147.6	30.7	-
		08:35:00	1.0	3.854	5.32	2787	0.60	8.2	155.1	30.8	-
		08:40:00	1.5	3.892	5.33	2701	0.51	6.9	157.2	30.8	-
		08:45:00	2.0	3.917	5.33	2558	0.44	6.0	159.4	30.8	-
		08:50:00	2.5	3.983	5.26	2391	0.42	5.7	167.0	30.9	-
		08:55:00	3.0	3.061	5.22	2290	0.43	5.8	174.4	31.0	-
		09:00:00	3.5	4.111	5.11	2139	0.61	8.1	189.5	31.0	-
		09:05:00	4.0	4.152	5.07	2055	0.71	9.7	198.2	31.0	-
		09:10:00	4.5	4.175	5.04	2000	0.91	12.2	203.7	31.0	-
		09:15:13	5.0	4.210	5.00	1865	1.61	21.7	213.4	30.9	-
		09:20:13	5.5	4.258	5.02	1889	1.67	22.7	215.5	31.0	-
		09:25:43	6.0	4.330	5.03	1915	1.59	21.5	216.5	31.0	-
		09:30:38	6.5	4.405	5.04	1925	1.52	20.5	216.0	31.1	-



Appendix B
Table 3 - Stabilisation parameters

Darwin Turf Club
EPL Monitoring

Stabilisation parameters

Well ID	Sampled Date/Time	Purge Vol L	Purge SWL m bTOC	pH Field pH Units	EC Field µS/cm	DO Field mg/L	DO Field %S	OPR Field mV	Temp Field °C	Turbidity Field NTU
MW02	17/01/2020 12:59	6.0	0.959	5.86	505.0	1.87	27.4	11.3	34.8	-
	23/04/2020 11:45	2.5	1.472	5.46	528.0	0.37	5.6	68.0	34.8	0.00
	28/04/2020 11:29	3.0	1.521	5.45	490.1	0.59	8.3	84.1	34.2	0.00
MW03	23/04/2020 11:10	2.0	2.158	4.76	582.0	0.93	13.2	209.4	34.0	20.90
	28/04/2020 10:36	2.5	2.264	4.67	586.0	0.36	5.0	236.7	33.8	0.00
	04/08/2020 11:46	3.0	2.878	5.02	406.4	0.29	4.0	229.0	32.8	9.56
	08/09/2020 10:53	7.0	3.049	4.81	422.8	0.00	0.0	202.1	33.6	1.00
	16/09/2020 10:08	2.5	3.085	5.60	529.0	0.00	0.0	-0.2	33.9	2197
	20/04/2021 13:15	2.5	4.696	5.22	481.1	0.03	0.5	183.2	32.8	0.79
	28/04/2021 12:15	3.5	2.793	5.21	491.5	0.06	0.8	204.2	32.8	1.80
	07/09/2021 11:55	3.5	3.26	5.85	545.0	0.22	2.9	133.6	32.1	66.11
	15/09/2021 12:30	4.0	3.316	5.96	487.6	0.21	3.0	102.9	33.7	-
MW04	17/01/2020 13:20	11	2.830	5.11	12521.0	2.06	32.1	193.3	32.3	-
	23/04/2020 12:41	4.0	1.966	5.23	6273.0	1.41	20.1	213.1	33.6	46.79
	28/04/2020 12:24	5.5	2.037	5.18	6729.0	1.04	14.8	229.2	33.3	5.06
	04/08/2020 12:34	4.0	2.899	5.11	9850.0	0.80	11.3	302.6	31.9	4.56
	08/09/2020 11:37	5.0	-153.500	4.65	18810.0	0.17	2.81	247.2	32.5	301.90
	16/09/2020 11:07	3.0	3.376	4.52	20888.0	0.00	0.00	225.9	33.2	63.10
	20/04/2021 12:20	4.0	2.280	5.63	7055.0	1.89	26.8	145.9	33.5	0.83
	28/04/2021 11:30	4.5	2.408	5.53	8828.0	1.42	20.2	229.3	33.2	1.63
	07/09/2021 11:15	1.2	-	5.73	24974	0.25	4.0	-9.1	32.2	0.00
	15/09/2021 11:40	2.5	2.130	5.63	22088	0.39	5.7	-60.9	32.6	-
MW05	17/01/2020 13:50	6.0	4.252	5.93	107.3	4.56	69.3	153.5	31.2	-
	23/04/2020 13:28	2.5	4.151	5.59	95.1	5.92	81.7	205.4	32.5	0.00
	28/04/2020 13:14	3.0	4.303	5.67	93.6	6.16	85.3	217.1	32.4	0.00
	04/08/2020 13:08	1.50	4.177	6.28	77.4	7.11	95.7	262.4	31.0	2.26
	08/09/2020 12:11	3.0	4.323	5.96	112.0	6.80	89.1	171.0	32.3	4.86
	16/09/2020 11:46	2.0	4.219	6.04	110.4	6.95	96.8	116.9	33.1	1.27
	20/04/2021 11:40	2.5	4.404	4.89	230.5	3.76	51.8	241.4	32.3	1.96
	28/04/2021 10:50	2.5	4.076	5.66	99.4	5.91	80.7	212.6	31.8	0.67
	07/09/2021 10:50	1.0	5.212	6.61	96.6	5.87	78.4	161.2	30.6	356.14
	15/09/2021 10:55	2.0	5.362	6.39	85.8	6.24	83.6	151.2	31.3	-
MW06	17/01/2020 14:30	6.0	3.510	5.05	232.2	4.28	60.0	221.5	32.5	-
	23/04/2020 09:33	3.5	4.382	4.63	353.4	0.34	4.7	208.1	33.0	0.00
	28/04/2020 09:11	2.5	4.423	4.69	290.9	0.33	4.6	201.9	32.4	1.56
	04/08/2020 09:35	1.75	5.763	4.61	109.8	0.42	5.9	283.1	31.7	11.02
	08/09/2020 12:55	2.5	5.745	4.35	107.9	0.57	7.79	245.1	33.5	7.94
	16/09/2020 12:27	2.5	6.028	4.32	103.9	20.2	1.43	249.8	34.1	12.10
	20/04/2021 11:08	4.0	4.410	4.90	355.0	0.52	7.4	215.5	31.6	1.87
	28/04/2021 09:22	3.0	4.547	4.97	338.3	0.13	1.8	219.9	31.2	2.10
	07/09/2021 12:40	1.2	6.070	5.60	111.3	1.51	20.8	195.5	32.4	395.5
	15/09/2021 09:40	4.0	5.837	5.56	94.7	1.63	22.6	181.9	32.3	-
MW07	23/04/2020 10:17	2.5	2.932	4.24	176.4	2.32	31.3	236.0	31.1	0.00
	28/04/2020 09:53	2.5	3.023	4.17	186.4	2.00	28.3	256.7	31.1	0.00
	04/08/2020 10:48	3.0	4.264	4.81	1651.0	0.48	6.5	179.9	30.8	6.66
	08/09/2020 13:42	2.0	4.121	4.53	2599.0	0.08	1.30	179.0	32.5	35.96
	16/09/2020 13:26	2.0	4.263	4.07	1710	25.6	1.72	247.1	32.7	20.11
	20/04/2021 10:32	4.5	3.037	4.46	281.8	1.54	20.5	199.9	30.3	2.18
	28/04/2021 10:10	4.0	3.399	4.45	331.4	2.32	31.6	233.5	30.4	2.14
	07/09/2021 09:40	1.6	4.361	5.46	2261.0	0.89	11.9	210.5	30.2	2.30
	15/09/2021 08:30	6.5	4.405	5.04	1925.0	1.52	20.5	216.0	31.1	-



**Appendix B - Table 4
Weather Monitoring Data**

Darwin Turf Club EPL Monitoring

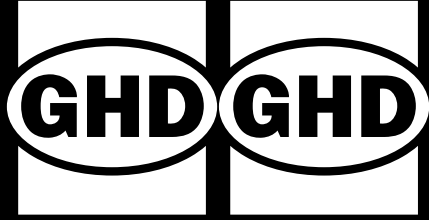
Date	Time	Wind speed (average) (m/s)	Wind speed (maximum) (m/s)	Temperature (°C)	Wind direction (bearing)	Signal (dB)
14/09/2021	06:00:00	N/A	N/A	N/A	N/A	N/A
14/09/2021	06:10:00	N/A	N/A	N/A	N/A	N/A
14/09/2021	06:20:00	N/A	N/A	N/A	N/A	N/A
14/09/2021	06:30:00	N/A	N/A	N/A	N/A	N/A
14/09/2021	06:40:00	0	1.2	25	Calm	N/A
14/09/2021	06:50:00	0	0	24	Calm	N/A
14/09/2021	07:00:00	0	0	24	Calm	-49
14/09/2021	07:10:00	0	0	24	Calm	-49
14/09/2021	07:20:00	0	0	24	Calm	-49
14/09/2021	07:30:00	0	0	24	Calm	-48
14/09/2021	07:40:00	0	0	24	Calm	-48
14/09/2021	07:50:00	0	0	24	Calm	-48
14/09/2021	08:00:00	0	0	25	Calm	-48
14/09/2021	08:10:00	0	0.8	25	Calm	-48
14/09/2021	08:20:00	0	1.4	26	Calm	-49
14/09/2021	08:30:00	0	0.7	26	Calm	-49
14/09/2021	08:40:00	0.1	1.5	26	99	-49
14/09/2021	08:50:00	0	1.9	27	Calm	-49
14/09/2021	09:00:00	0	0	27	Calm	-48
14/09/2021	09:10:00	0	1.8	27	Calm	-48
14/09/2021	09:20:00	0	0	28	Calm	-48
14/09/2021	09:30:00	0	0	29	Calm	-48
14/09/2021	09:40:00	0	0.9	29	Calm	-48
14/09/2021	09:50:00	0	0	29	Calm	-48
14/09/2021	10:00:00	0	0	30	Calm	-46
14/09/2021	10:10:00	0	0	31	Calm	-46
14/09/2021	10:20:00	0	1.6	31	Calm	-47
14/09/2021	10:30:00	0.9	3	31	276	-47
14/09/2021	10:40:00	1.4	3.4	29	264	-47
14/09/2021	10:50:00	1	3.3	28	277	-47
14/09/2021	11:00:00	1.4	3	28	273	-43
14/09/2021	11:10:00	1.5	3.1	29	292	-43
14/09/2021	11:20:00	1	3.4	29	266	-43
14/09/2021	11:30:00	1.6	3.2	29	270	-43
14/09/2021	11:40:00	1.3	3.3	29	262	-43
14/09/2021	11:50:00	1.1	3	29	280	-43
14/09/2021	12:00:00	2	4.4	29	284	-43
14/09/2021	12:10:00	1.9	3.3	29	287	-43
14/09/2021	12:20:00	2.5	4	30	276	-43
14/09/2021	12:30:00	2.2	3.7	30	300	-43
14/09/2021	12:40:00	3	4.9	30	265	-43
14/09/2021	12:50:00	2.5	4.5	31	258	-43
14/09/2021	13:00:00	2.8	4.4	31	278	-43
14/09/2021	13:10:00	3.1	5	31	351	-43
14/09/2021	13:20:00	2.9	5.2	31	37	-43
14/09/2021	13:30:00	1.9	5.2	29	46	-44
14/09/2021	13:40:00	1.6	3.4	27	11	-44
14/09/2021	13:50:00	1.9	3.7	26	24	-45
14/09/2021	14:00:00	2.3	4	27	27	-50
14/09/2021	14:10:00	2.9	4.8	29	24	-50
14/09/2021	14:20:00	3.1	4.7	30	25	-50
14/09/2021	14:30:00	2.7	4.3	31	21	-50
14/09/2021	14:40:00	2.6	5.1	31	38	-50
14/09/2021	14:50:00	2.5	3.9	31	29	-50
14/09/2021	15:00:00	2.2	4	30	23	-49
14/09/2021	15:10:00	2.3	4.1	30	26	-49
14/09/2021	15:20:00	2.9	4.4	30	19	-49
14/09/2021	15:30:00	3.5	5	31	350	-49
14/09/2021	15:40:00	3.3	5.1	32	350	-49
14/09/2021	15:50:00	3.1	4.5	32	346	-50
14/09/2021	16:00:00	3.1	4.8	32	344	-46



Appendix B - Table 4
Weather Monitoring Data

Darwin Turf Club EPL Monitoring

Date	Time	Wind speed (average) (m/s)	Wind speed (maximum) (m/s)	Temperature (°C)	Wind direction (bearing)	Signal (dB)
14/09/2021	16:10:00	3	4.8	31	1	-47
14/09/2021	16:20:00	3	4.9	31	359	-47
14/09/2021	16:30:00	3.1	4.8	31	5	-47
14/09/2021	16:40:00	2.9	4.8	31	1	-48
14/09/2021	16:50:00	2.8	4.6	31	347	-48
14/09/2021	17:00:00	2.9	4.9	31	350	-47
14/09/2021	17:10:00	2.7	4.8	30	343	-47
14/09/2021	17:20:00	2.4	4.7	30	327	-46
14/09/2021	17:30:00	2.4	3.7	30	337	-46
14/09/2021	17:40:00	2.3	3.5	29	327	-46
14/09/2021	17:50:00	2.3	3.4	29	307	-46
14/09/2021	18:00:00	2.2	3.7	29	304	-43
14/09/2021	18:10:00	2.6	4	29	296	-43
14/09/2021	18:20:00	2.8	4.5	28	295	-43
14/09/2021	18:30:00	2.6	4.4	28	280	-43
14/09/2021	18:40:00	2.7	4.1	27	277	-43
14/09/2021	18:50:00	2.2	4.4	27	277	-43



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Appendix B

2021 – 2022 Annual Return Form

ANNUAL RETURN

Information on this form is required in accordance with the conditions of your licence or approval issued under part 5 of the *Waste Management and Pollution Control Act* or part 7 of the *Water Act*.

Failure to provide the information requested on this form and/or the provision of false or misleading information is an offence under the legislation and you may be liable to heavy penalties.

LICENCE/APPROVAL NO.	EPL218 - 02
REPORTING PERIOD	01/09/2021 - 31/08/2022

Section 1. Licence/Approval Holder Details

Please check your business details and contact details including 24 hour emergency response in NT EPA online and/or on page one of your licence.

Are these details correct?

☒ Yes Go to Section 2

☐ No Please correct your details by updating in NT EPA Online or complete the table below.

Licence holder	
Legal Entity Name:	Darwin Turf Club Inc.
ABN:	21 373 066 193
Registered Business Address:	20 Dick Ward Drive, Fannie Bay NT 0820
Postal Address:	GPO Box 589, Darwin NT 0801
Contact Person:	Grant Dewsbury
Position Title:	CEO
Contact Details:	
b/h:	0889234222
mobile:	0437998199
email:	gdewsbury@darwinturfclub.org.au
Location of premises	
Address:	20 Dick Ward Drive, Fannie Bay NT 0820
24 hour emergency response	
Position Title:	Grant Dewsbury CEO
phone:	
mobile:	0437998199

Section 2. Statement of Compliance

Were all conditions of the licence/approval complied with during the reporting period?

☐ Yes Proceed to Section 4.

☒ No Complete details below (add more rows if required)

Details of Non-compliance				
Condition number	Date of non-compliance (dd/mm/yy)	Was NT EPA notified? (Yes / No)	If yes, date NT EPA notified (dd/mm/yy)	If yes, how was NT EPA notified? (e.g. phone, email, Pollution Hotline)
		If no, complete Section 3		
EPL218-01	20/04/2022	Yes	15/06/2022	letter/email
Clause 38	11/05/2022			see attached

Section 3. Report of Non-compliance

Please supply the following details for each non-compliance not reported to the NT EPA identified in Section 2. Use a separate page for each non-compliance.

The date and time of the non-compliance.
When the non-compliance was detected and by whom.
The actual and potential causes and contributing factors to the non-compliance.
The risk of environmental harm arising from the non-compliance.
The action(s) that have or will be undertaken to mitigate any environmental harm arising from the non-compliance.
Corrective actions that have or will be undertaken to ensure the non-compliance does not reoccur.
If no action was taken, why no action was taken.

Section 4. Signature and Certification

This declaration must only be signed by a person(s) with the legal authority to sign it. The ways in which the application may be signed, and the people who may sign the application, are set out in the categories below.			
If the licence holder is:	Tick	The application must be signed and certified by one of the following:	
An individual	☐	The individual.	
A partnership	☐	A partner.	
A company	☐	The common seal being affixed in accordance with the <i>Corporations Act</i> , or	
	☐	Two directors, or	
	☐	A director and a company secretary, or	
	☐	If a proprietary company that has a sole director who is also the sole company secretary – by that director.	
A public authority	☒	The Chief Executive Officer (CEO) of the public authority, or	
	☐	By a person delegated to sign on the public authority's behalf in accordance with its legislation (Please note: a copy of the relevant instrument of delegation must be attached to this application).	
I/We hereby declare that the information provided in this Annual Return and accompanying documents is to the best of my/our knowledge, true and correct.			
Signature		Signature	
Name (printed)	Grant Dewsbury	Name (printed)	
Position	CEO	Position	
Date	06/09/2022	Date	
Seal (if signing under seal):			



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