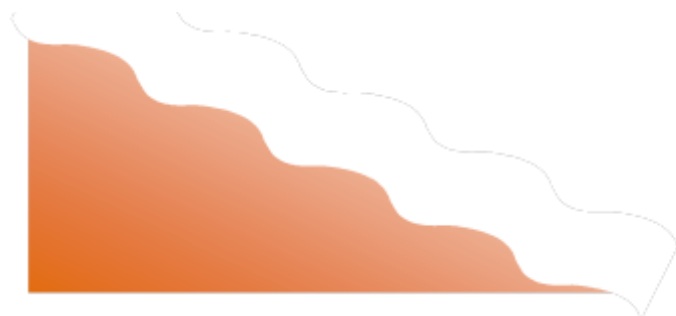
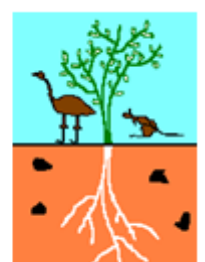


# ALICE SPRINGS TURF CLUB ENVIRONMENTAL MONITORING REPORT

July 2020 – July 2021



Prepared By:  
Low Ecological Services P/L  
PO Box 3130, Alice Springs, NT 0871  
Ph: (08) 89 555 222 Fax: (08) 89 555 722  
Email: [lowecol@lowecol.com.au](mailto:lowecol@lowecol.com.au)  
Web: [www.lowecol.com.au](http://www.lowecol.com.au)



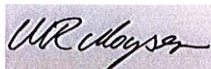
**Disclaimer:**

This document has been prepared by Low Ecological Services (LES) for Alice Springs Turf Club (Turf Club) in accordance with an agreement with the Turf Club. LES has prepared this document using the skill and care expected from professional scientists to provide factual and technical information and reasonable solutions to identified risks. It does not constitute legal advice.

**Project:**

Prepare a Monitoring Report for the Alice Springs Turf Club as per the requirements of EPL 208.

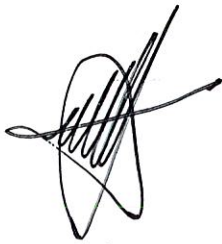
**Approved by:**

| Approval    | Name                        | Signature                                                                           | Date                         |
|-------------|-----------------------------|-------------------------------------------------------------------------------------|------------------------------|
| Originator: | Mac Moyses                  |   | 20/07/2021<br>Revised 3/9/21 |
| Reviewer:   | Bill Low                    |    | 6/9/21                       |
| Approver:   | Tom Slattery,<br>CEO, ASTC. |  | 7/9/2021                     |

**Certification:**

I Tom Slattery, Chief Executive Officer, ASTC, have reviewed this report and I confirm that to the best of my knowledge and ability all the information provided in the report is true and accurate.

Signature:



Date:

7/09/2021

## Contents

|       |                                                                                                |    |
|-------|------------------------------------------------------------------------------------------------|----|
| 1     | Executive Summary .....                                                                        | 4  |
| 2     | Introduction .....                                                                             | 5  |
| 3     | Monitoring Objectives .....                                                                    | 5  |
| 4     | Monitoring System .....                                                                        | 5  |
| 4.1   | Sampling Program .....                                                                         | 5  |
| 4.2   | Groundwater Sampling .....                                                                     | 6  |
| 4.2.1 | Assessment Criteria .....                                                                      | 8  |
| 4.3   | Surface Water Sampling .....                                                                   | 8  |
| 4.3.1 | Assessment.....                                                                                | 10 |
| 4.4   | Soil Sampling .....                                                                            | 10 |
| 4.5   | Quality Control and Assurance .....                                                            | 11 |
| 4.5.1 | Laboratory Analyses .....                                                                      | 11 |
| 4.5.2 | Laboratory Duplicate (DUP) Report.....                                                         | 11 |
| 4.5.3 | Method Blank (MB) and Laboratory Control Spike (LCS) Report .....                              | 12 |
| 4.5.4 | Matrix Spike (MS) Report .....                                                                 | 12 |
| 5     | Groundwater Sampling Results .....                                                             | 12 |
| 5.1   | Site Observations.....                                                                         | 12 |
| 5.2   | Laboratory Results.....                                                                        | 15 |
| 6     | Surface Water Sampling Results.....                                                            | 15 |
| 7     | Discussion and Interpretation of Results.....                                                  | 16 |
| 7.1   | Groundwater .....                                                                              | 16 |
| 7.2   | Surface Water.....                                                                             | 17 |
| 8     | Conclusions and Recommendations.....                                                           | 17 |
| 9     | References.....                                                                                | 18 |
|       | Appendices .....                                                                               | 19 |
| 10    | Appendix 1 – ALS Certificates of Analysis and Analytical Results for Groundwater Samples ....  | 19 |
| 11    | Appendix 2 – ALS Certificates of Analysis and Analytical Results for Surface Water Samples ... | 19 |

## List of Figures

|                                                                                |   |
|--------------------------------------------------------------------------------|---|
| Figure 1 Groundwater monitoring bore locations.....                            | 7 |
| Figure 2 Surface water sample locations for samples taken 6 October, 2020..... | 9 |

## List of Tables

|                                                                                            |    |
|--------------------------------------------------------------------------------------------|----|
| Table 1 Groundwater monitoring bore locations. ....                                        | 7  |
| Table 2. Groundwater assessment criteria – Attachment B to EPL 208. ....                   | 8  |
| Table 3 Surface water sampling locations. ....                                             | 8  |
| Table 4 Groundwater assessment criteria.....                                               | 10 |
| Table 5. Location and description of soil sampling sites.....                              | 11 |
| Table 6. Groundwater quality results from four samplings during the reporting period. .... | 13 |
| Table 7 Groundwater samples that exceeded trigger values. ....                             | 15 |
| Table 8. Surface Water Samples taken 6 October, 2020 that exceeded trigger values.....     | 16 |

## 1 Executive Summary

The Alice Springs Turf Club Incorporated (Turf Club) commissions Low Ecological Services (LES) to undertake environmental monitoring required under environmental protection licence (EPL) 208, specifically conditions 43, 44 and 45. This includes the Turf Club providing the Northern Territory Environmental Protection Agency (NTEPA) with a monitoring report with each annual return. This Monitoring Report was prepared in accordance with the requirements of the NTEPA Guideline for Reporting on Environmental Monitoring.

In the 12-month period 2018-2019, the NTEPA inspected Turf Club operations and required the Club to address multiple non-compliances. Improved practices and increased environmental monitoring were carried out on the site during 2019 and 2020, including additional soil and waste oil monitoring. Following an inspection by NTEPA in the 4<sup>th</sup> quarter of 2020 the Turf Club was directed to address soil contamination resulting from spilled waste oil at the site of former waste oil storage. The source of this contamination has been removed. Investigation of the extent and risks of this contamination and remediation of the site is the subject of a separate report in current preparation.

Programmed monitoring under EPL 208 includes four groundwater sampling locations, five surface water sampling locations and ten soil sampling locations. One sampling event comprises groundwater sampling undertaken before following an application of oil to the racetrack. Two sampling events were completed during the reporting period. Because the second application / event occurred late in the reporting period this report includes data and analysis for samples taken 29 July 2021 post oil application, one week beyond the normal reporting period. Opportunistic surface water sampling was undertaken following rain in October 2020. Other sporadic rainfall events were not able to be sampled for logistical reasons. Soil sampling according to EPL 208 was not undertaken during the reporting period due to resources being diverted to investigating soil contamination at the former oil storage site.

In summary, monitoring undertaken during the reporting period included:

- ❖ Opportunistic surface water sampling and analysis: 6 October 2020.
- ❖ Ground water monitoring for oil application Event 1:
  - Oil applied to racetrack 29-30 December 2020.
  - Pre-application groundwater sampling 18 December 2020
  - Post-oil application groundwater sampling 9 January 2021
- ❖ Ground water monitoring for oil application Event 2:
  - Oil applied to racetrack 14 and 21 May, 6 June, 28 July.
  - Pre-application groundwater sampling 12 May
  - Post-oil application groundwater 29 July 2021.

Monitoring results suggest that the risk of oil migrating off the track into soil, groundwater or nearby watercourses is low. Testing in 2019-2020 showed that depth of oil penetration beneath the track surface did not exceed 400mm. No ground water samples collected in this reporting period contained hydrocarbons within limits of laboratory reporting. Metal levels for some bore samples exceeded stipulated trigger values. These however are likely to be naturally occurring in the local groundwater.

While some surface water samples also exceeded metals trigger values and one sample exceeded the hydrocarbon trigger value these are also unlikely to be related to migration of waste oil applied to the racetrack.

## 2 Introduction

Low Ecological Services undertakes environmental monitoring required under EPL 208 on behalf of the Alice Springs Turf Club. Conditions 43, 44 and 45 of the EPL requires the Turf Club provide the NTEPA with a monitoring report with each Annual Return. This Monitoring Report is prepared in accordance with the requirements of the NTEPA Guideline for Reporting on Environmental Monitoring.

## 3 Monitoring Objectives

Consistent with EPL 208 and NTEPA guidelines, the monitoring objectives of the Turf Club are:

- To determine baseline environmental conditions;
- To monitor short/long term trends at the Turf Club;
- To determine the potential effects on the environment due to the management of the Turf Club;
- To manage the quality and condition of groundwater, surface water and soil in the area surrounding the Turf Club;
- To monitor compliance with Australian standards and other regulatory requirements; and
- To identify any potential need for remedial and/or mitigation measures.

This Monitoring Report details the sampling and analysis of groundwater and surface water from within, and within the vicinity of the Turf Club to identify environmental harm, if any, arising from the application of waste oil to the racetrack surface. Monitoring required under the EPL 208 encompasses:

- Testing groundwater samples from four selected groundwater wells located within and downslope of the racecourse. Sampling for each application of waste oil to the racetrack;
  - Prior to application of waste oil to the track (within two weeks); and
  - Post application of waste oil to the track (within 48 hours).
- Testing of surface water samples from five locations selected from around the Turf Club post any significant rainfall events, when surface water is available for sampling, annually if possible.
- Testing of soil samples from ten locations selected from around the Turf Club. Annual sampling event.

## 4 Monitoring System

### 4.1 Sampling Program

The current monitoring program includes:

- Four groundwater sample locations; bores described in Table 1 and shown in Figure 1,
- Five surface water locations described in Table 3 and shown in Figure 2,
- Ten soil sampling locations described in Table 5.

Bore RN 03607 was initially sampled in the first year of the EPL but collapsed in 2018. It has been substituted with RN 18252 located 200m closer to and downstream of the racecourse.

Surface water sampling depends on rainfall and availability of resources. Due to weather variability and the area's free-draining soils, significant rainfall and rapid response is necessary to obtain surface water samples.

## 4.2 Groundwater Sampling

The groundwater sampling program is designed to detect contamination of groundwater systems if waste oil contaminants migrate from the track through the soil profile into groundwater.

Groundwater sampling was undertaken on four occasions within the 2020-21 reporting period. Standard procedures applied for each sampling includes bore inspection to note any factors that may impact laboratory results, measuring static water level and recording electronic meter readings. Sampling uses new bailers for every sample to ensure there is no cross contamination between bores and samples. A minimum of 10 litres of water is purged / bailed out. Field data is measured during the purging to determine stability of purged water composition using a calibrated YSI (Professional PLUS) water quality meter. Field data parameters noted include:

- Water Temperature;
- Electrical Conductivity ( $\mu\text{S}/\text{cm}$  );
- Dissolved Oxygen (% sat);
- Dissolved Oxygen (mg/L);
- pH; and
- Turbidity.

Following purging and recording field data, samples are collected as per laboratory standards in sample containers provided and specified by the laboratory, including appropriate preservative/s for analytes as required. All samples are labelled and placed into a cooled esky and transported to the ALS Sydney lab within specified holding times.

*Table 1 Groundwater monitoring bore locations.*

| Sample ID | Location                 | Parameters                                                       | Reason for Sampling                                                  |
|-----------|--------------------------|------------------------------------------------------------------|----------------------------------------------------------------------|
| RN4541    | 150m West of track       | Field Parameters, Laboratory Parameters, BTEX, Heavy Metals, TRH | Representative sample of groundwater in close proximity to the track |
| RN18251   | 50m South of track       | Field Parameters, Laboratory Parameters, BTEX, Heavy Metals, TRH | Representative sample of groundwater in close proximity to the track |
| RN3098    | 100m East of track       | Field Parameters, Laboratory Parameters, BTEX, Heavy Metals, TRH | Representative sample of groundwater in close proximity to the track |
| RN3067    | 600m East of track       | N/A                                                              | Bore collapsed and is no longer tenable. Replaced by RN18252         |
| RN18252   | 400m South-East of track | Field Parameters, Laboratory Parameters, BTEX, Heavy Metals, TRH | Representative sample of groundwater in close proximity to the track |



*Figure 1 Groundwater monitoring bore locations.*

#### 4.2.1 Assessment Criteria

*Table 2. Groundwater assessment criteria – Attachment B to EPL 208.*

| Parameter                            | Units        | EPA Trigger Values |
|--------------------------------------|--------------|--------------------|
| Field Parameters                     |              |                    |
| pH                                   | pH units     | 6.0-8.0            |
| Temperature                          | °C           | N/A                |
| Turbidity                            | NTU          | 2-15               |
| Electrical Conductivity              | µS/cm        | 20-250             |
| Laboratory Parameters                |              |                    |
| Dissolved Oxygen                     | % Saturation | 80-110             |
| BTEX                                 |              |                    |
| Benzene                              | mg/L         | 0.3                |
| Toluene                              | mg/L         | 0.3                |
| Ethylbenzene                         | mg/L         | 0.005              |
| Xylenes                              | mg/L         | 0.075              |
| 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              |
| Total Recoverable Hydrocarbons (TRH) |              |                    |
| Total TPH C10-C36                    | mg/L         | 0.6                |

#### 4.3 Surface Water Sampling

Surface water sampling is designed to detect contamination of surface water by the Turf Club through the migration of oil and contaminants from the track into the surrounding area and watercourses from rainfall and surface drainage. Surface water samples are collected opportunistically when and where surface water appears after rain. Locations of surface water samples collected within this reporting period approximate soil sampling locations from the EMP. See Table 2 and Figure 2.

*Table 3 Surface water sampling locations.*

| Sample ID | Location                   | Parameters                                     | Reason for Sampling                               |
|-----------|----------------------------|------------------------------------------------|---------------------------------------------------|
| S01_TC    | -23.755726°<br>133.879837° | Laboratory Parameters, BTEX, Heavy Metals, TRH | To analyse run-off pooling the east of the track. |

|        |                            |                                                   |                                                                              |
|--------|----------------------------|---------------------------------------------------|------------------------------------------------------------------------------|
| S05_TC | -23.753999°<br>133.873317° | Laboratory Parameters, BTEX,<br>Heavy Metals, TRH | To analyse run-off pooling west of the track<br>near St Marys Creek.         |
| S06_TC | -23.751111°<br>133.877296° | Laboratory Parameters, BTEX,<br>Heavy Metals, TRH | To analyse run-off pooling near the inside of<br>the track / northeast area. |
| S08_TC | -23.750698°<br>133.875140° | Laboratory Parameters, BTEX,<br>Heavy Metals, TRH | To analyse run-off pooling west of the track                                 |
| S09_TC | -23.753598°<br>133.876436° | Laboratory Parameters, BTEX,<br>Heavy Metals, TRH | To analyse run-off pooling in centre of the<br>racetrack                     |



Figure 2 Surface water sample locations for samples taken 6 October, 2020.

#### 4.3.1 Assessment

Results of surface water sampling assessed against criteria are presented in Table 6.

**Table 4 Groundwater assessment criteria.**

| Parameter                            | Units        | Trigger Values in EPL 208 Attachment B | Australian Drinking Water Guidelines 2011 |
|--------------------------------------|--------------|----------------------------------------|-------------------------------------------|
| Laboratory 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                                 |                                           |
| BTEX                                 |              |                                        |                                           |
| Benzene                              | mg/L         | 0.3                                    |                                           |
| Toluene                              | mg/L         | 0.3                                    |                                           |
| Ethylbenzene                         | mg/L         | 0.005                                  |                                           |
| Xylenes                              | mg/L         | 0.075                                  |                                           |
| Heavy Metals                         |              |                                        |                                           |
| Arsenic                              | mg/L         | 0.094                                  | 0.01                                      |
| Cadmium                              | mg/L         | 0.0004                                 | 0.002                                     |
| Chromium                             | mg/L         | 0.006                                  | 0.05                                      |
| Copper                               | mg/L         | 0.0018                                 | 2                                         |
| Lead                                 | mg/L         | 0.0056                                 | 0.01                                      |
| Mercury                              | mg/L         | 0.0019                                 | 0.001                                     |
| Nickel                               | mg/L         | 0.013                                  | 0.02                                      |
| Zinc                                 | mg/L         | 0.015                                  | 3                                         |
| Total Recoverable Hydrocarbons (TRH) |              |                                        |                                           |
| Total TPH C10-C36                    | mg/L         | 0.6                                    |                                           |

#### 4.4 Soil Sampling

Soil sampling as prescribed in the Environmental Management Plan was not carried out in the reporting period. Resources were diverted to investigate soil contamination at the former waste oil storage site located between the north-west corner of the track and St Mary's Creek. A contamination and remediation report regarding this waste oil spill is in current preparation. Table 5 describes soil sampling locations and rationale.

**Table 5. Location and description of soil sampling sites.**

| Site Code | Description                                                                                   | Latitude    | Longitude   |
|-----------|-----------------------------------------------------------------------------------------------|-------------|-------------|
| S01_TC    | Drain on south-eastern edge of Racetrack                                                      | -23.755726° | 133.879837° |
| S02_TC    | Drain on south-western edge of Racetrack, heading into St Marys Creek                         | -23.756480° | 133.874159° |
| S03_TC    | Low point on edge of south-western racetrack edge                                             | -23.756094° | 133.874604° |
| S04_TC    | St Marys Creek, downslope of waste oil storage area                                           | -23.754096° | 133.873041° |
| S05_TC    | Bank of St Marys Creek adjacent to waste oil storage area                                     | -23.753999° | 133.873317° |
| S06_TC    | Inside of Racetrack on north-eastern edge of Racetrack                                        | -23.751111° | 133.877296° |
| S07_TC    | Outside of north-eastern edge of Racetrack                                                    | -23.751405° | 133.876753° |
| S08_TC    | Outside edge of northern-western edge of Racetrack. Between Racetrack and the women's shelter | -23.750698° | 133.875140° |
| S09_TC    | Centre of Racetrack                                                                           | -23.753598° | 133.876436° |
| S10_TC    | Directly inside of Racetrack surface                                                          | -23.752708° | 133.874443° |

## 4.5 Quality Control and Assurance

All samples will be collected in appropriate laboratory supplied sampling containers, as per laboratory requirements. The sample containers will be placed into an ice chilled esky and transported to the laboratory under standard chain of custody (COC) procedures to a National Association of Testing authorities (NATA) accredited laboratory for analysis within required holding times.

Disposable and/or dedicated sampling equipment is used where required between each sample and sampling location. Where sampling equipment is of a non-disposable nature, decontamination of sampling equipment is carried out between each sample and sampling location.

### 4.5.1 Laboratory Analyses

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

Upon sampling and analysis, the NATA accredited ALS laboratory will conduct the following quality control procedures as part of their internal Quality Control Report:

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

### 4.5.2 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%.

#### 4.5.3 Method Blank (MB) and Laboratory Control Spike (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 Spike (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.

#### 4.5.4 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.

## 5 Groundwater Sampling Results

### 5.1 Site Observations

Water quality measurements taken in the field are presented below in **Table 6**. Readings that exceed trigger values are highlighted. A synopsis of these results is presented here, Groundwater temperatures were within a narrow range from 24.55°C to 26.7°C;

- Electrical conductivity ranged from 0.79 µS/cm to 4.24 µS/cm; (Trigger value 20-250 µS/cm)
- Dissolved oxygen (DO) concentrations ranged from 22.4 % sat to 56.0 % saturation; (Trigger value 80-110%)
- Field pH levels ranged from 6.92 to 7.71; (Trigger value 6.0 – 8.0)
- Turbidity levels ranged from 5.0 NTU to 79.8 NTU. (trigger value 2 – 15)

Table 6. Groundwater quality results from four samplings during the reporting period.

| Bore No. | Date Sampled | Depth to Water (m) | Water Temp (°C) | Elec. Cond. (µS/cm) | DO (% sat) | DO (mg/L) | pH   | Turbidity(NTU) | Comments                                          |
|----------|--------------|--------------------|-----------------|---------------------|------------|-----------|------|----------------|---------------------------------------------------|
| RN 4541  | 18/12/2020   | 19.42              | 26.7            | 1.87                | 27.3       | 2.08      | 6.92 | 34.1           | Dark particles in water. Clear. No sheen or odour |
|          | 09/01/2021   | 18.56              | 24.6            | 2.16                | 26.0       | 2.15      | 7.16 | 25.0           | Clear, earthy odour.                              |
|          | 12/05/2021   | 18.61              | 25.3            | 2.3                 | 39.2       | 2.85      | 7.37 | 24.1           | No sheen.<br>Slight sulphurous odour              |
|          | 29/07/2021   | 19.60              | 26.6            | 2.25                | 37.7       | 3.00      | 7.71 | 30.2           | No odour or sheen                                 |
| RN 18251 | 18/12/2020   | 18.13              | 25.7            | 3.14                | 28.1       | 2.23      | 7.15 | 5.74           | Clear. No sheen or odour.                         |
|          | 09/01/2021   | 18.11              | 26.3            | 3.83                | 48.0       | 3.8       | 7.03 | 5.0            | Clear, earthy odour                               |
|          | 12/05/2021   | 18.32              | 25.4            | 4.24                | 52.5       | 4.01      | 7.11 | 8.69           | No sheen.<br>Slight sulphurous odour              |
|          | 29/07/2021   | 18.30              | 26.0            | 4.15                | 41.5       | 3.39      | 7.12 | 17.0           | No odour or sheen                                 |

| Bore No. | Date Sampled | Depth to Water (m) | Water Temp (°C) | Elec. Cond. (µS/cm) | DO (% sat) | DO (mg/L) | pH   | Turbidity(NTU) | Comments                                            |  |
|----------|--------------|--------------------|-----------------|---------------------|------------|-----------|------|----------------|-----------------------------------------------------|--|
| RN 3098  | 18/12/2020   | 17.78              | 26.4            | 0.79                | 22.4       | 1.71      | 7.05 | 36.7           | A few solid particles.<br>Clear. No Sheen or odour. |  |
|          | 09/01/2021   | 16.86              | 26.3            | 0.89                | 56.0       | 4.2       | 7.5  | 30.1           | Clear, no sheen or odour.                           |  |
|          | 12/05/2021   | 17.54              | 25.7            | 0.96                | 43.6       | 3.55      | 7.46 | 38.4           | No sheen.<br>Slight sulphurous odour                |  |
|          | 29/07/2021   | 17.67              | 24.5            | 0.98                | 41.1       | 3.35      | 7.30 | 38.4           | No odour or sheen                                   |  |
| RN 18252 | 18/12/2020   | 17.54              | 26.0            | 2.58                | 30.9       | 2.45      | 6.94 | 5.04           | Clear. No sheen or odour.                           |  |
|          | 09/01/2021   | 17.55              | 25.6            | 3.13                | 48.7       | 3.92      | 7.26 | 9.0            | Clear. No sheen or odour.                           |  |
|          | 12/05/2021   | 17.69              | 25.0            | 3.32                | 46.5       | 3.79      | 7.14 | 9.64           | No odour or sheen.                                  |  |
|          | 29/07/2021   | 17.81              | 25.4            | 3.21                | 68.7       | 5.59      | 7.08 | 79.8           | No odour or sheen.                                  |  |

## 5.2 Laboratory Results

Laboratory reports (analytical results) for the four sets of groundwater / bore samples are presented in full in Appendix 1. All analytes sampled for; including heavy metals, BTEX and TRH were below the limit of reporting (LOR) or the adopted trigger values, except for copper and zinc. Exceedances of the trigger values for copper and zinc are presented in Table 7 and discussed in Section 7.1.

*Table 7 Groundwater samples that exceeded trigger values.*

| Sampling Date        | Bore     | Copper (mg/L) | Zinc (mg/L)  |
|----------------------|----------|---------------|--------------|
| <b>Trigger value</b> |          | <b>0.0018</b> | <b>0.015</b> |
| 18/12/2020           | RN 4541  | 0.044         | 0.016        |
|                      | RN 18251 | -             | 0.037        |
|                      | RN 3098  | -             | 0.036        |
|                      | RN 18252 | -             | 0.061        |
| 9/01/2021            | RN 4541  | 0.003         | 0.053        |
|                      | RN 18251 | -             | 0.028        |
|                      | RN 3098  | 0.002         | 0.040        |
|                      | RN 18252 | 0.023         | 0.030        |
| 12/05/2021           | RN 4541  | -             | -            |
|                      | RN 18251 | -             | 0.038        |
|                      | RN 3098  | -             | -            |
|                      | RN 18252 | 0.007         | -            |
| 29/07/2021           | RN 4541  | 0.007         | 0.016        |
|                      | RN 18251 | 0.005         | 0.086        |
|                      | RN 3098  | 0.006         | -            |
|                      | RN 18252 | 0.012         | 0.040        |

## 6 Surface Water Sampling Results

Surface water sampling was carried out. Laboratory reports (analytical results) for the surface water samples collected on 6 October, 2020 are presented in full in Appendix 2. Samples with values that exceeded trigger limits as per Attachment B – 2018/2020 Groundwater Monitoring Schedule are highlighted Table 8.

Table 8. Surface Water Samples taken 6 October, 2020 that exceeded trigger values.

| Sample Point  | Copper mg/l | Zinc mg/l | Chromium mg/l | Nickel mg/l | Lead mg/l | Total TPH (C10-C36) mg/l |
|---------------|-------------|-----------|---------------|-------------|-----------|--------------------------|
| Trigger Value | 0.0018      | 0.015     | 0.006         | 0.013       | 0.0056    | 0.6                      |
| SW01-TC       | 0.010       | 0.030     | 0.007         | -           | 0.006     | -                        |
| SW05-TC       | 0.004       | 0.040     | -             | -           | -         | 0.98                     |
| SW06-TC       | 0.009       | 0.030     | 0.013         | -           | 0.007     | -                        |
| SW08-TC       | 0.002       | 0.023     | -             | -           | -         | -                        |
| SW09-TC       | 0.018       | 0.052     | 0.027         | 0.014       | 0.015     | -                        |

## 7 Discussion and Interpretation of Results

### 7.1 Groundwater

#### Field Measurements:

All 16 field measurements exceeded the trigger value for electrical conductivity and 10 of 16 field measurements exceeded the trigger value for turbidity. Previous annual monitoring reports have questioned the validity of whether the trigger values provided are appropriate for this project. The EPL208 (Attachment B) trigger values 20-250  $\mu\text{S}/\text{cm}$  for electrical conductivity are very low values for groundwater. An average value of 3549  $\mu\text{S}/\text{cm}$  is reported for arid zone water bores taken from a total of 12508 samples in *A preliminary overview of groundwater quality in the Northern Territory*, (McDonald, 1993).

#### Metals results:

Analytical results for copper and zinc have consistently exceeded specified trigger values in each of the three previous monitoring periods. In this reporting period, ground water samples exceeded trigger values for 9 of 16 samples for copper and 12 of 16 samples for zinc. It is noteworthy that all results for copper were well below the Groundwater Investigation Level of 2mg/L for drinking water given in NEPM 2013 and all results for zinc were well below the Australian Drinking Water Guidelines 2011, of 3mg/L for Zinc.

The consistent levels of copper and zinc in all bores suggests that these are naturally occurring groundwater levels rather than a result of waste oil residue from racetrack treatments. Bore RN003098 is appropriate as a control site as it is located lateral to the groundwater flow direction in the area and RN18252 is located 430m from the site. An additional control site bore that is located upstream and some distance away (>100m) from the racetrack would be beneficial to the monitoring program to derive baseline or control “clean” groundwater chemistry data.

## 7.2 Surface Water

All surface water samples exceeded specified Copper and Zinc trigger values. In addition to copper and zinc results from sample location SW09-TC exceeded trigger values for Chromium, Nickel and Lead and SW01-TC and SW06-TC both exceeded trigger values for Chromium and Lead. In comparing results to Australian Drinking Water Guidelines 2011, the sample SW09-TC slightly exceeded the standard for Lead, reading .015 against a trigger value of .01. S09 is located in the centre of the track with no obvious source of contamination. Soil samples taken within the same area were found to have levels of lead and zinc well below NEPM 2013 HILS in 2019 and 2020 indicating the contamination has not accumulated in the soil.

Laboratory results found levels of hydrocarbons for TPH C10-C36 to exceed the trigger value of 0.6mg/l for the sample taken at SW05-TC, which gave a result of 0.98mg/l. This sample site is located west of the racetrack in an area subject to racecourse plant and maintenance vehicle traffic which may explain this incidence of hydrocarbon presence. This report recommends refining the monitoring program to exclude surface water sampling where vehicles may pass.

## 8 Conclusions and Recommendations

Environmental monitoring conducted in the past year included two ground water monitoring events, coinciding with waste oil applications to the track, and one surface water sampling event.

- Exceedances of trigger values provided in Attachment B – 2018/2020 Groundwater Monitoring Schedule as part of the Turf Clubs EPL 208 were identified during groundwater monitoring for 9 of 16 samples for copper and 12 of 16 samples for zinc. all results for copper were well below the Groundwater Investigation Level of 2mg/L for drinking water given in NEPM 2013 and all results for zinc were well below the Australian Drinking Water Guidelines 2011, of 3mg/L for Zinc. The distribution of the exceedances over the sampling bores indicate these values are normal background levels for this area
- Surface water samples from puddled water all exceeded specified trigger values for copper and zinc. Sampled sites also variously exceeded trigger values for Lead, Nickel and Chromium. One sample exceeded the trigger value for presence of hydrocarbon although racetrack oil is unlikely to be the source of this trace.

It is concluded that:

- Groundwater electrical conductivity and turbidity levels, while exceeding trigger values are notionally 'natural' and do not present issues of concern relating to the application waste oil on the racetrack.
- Levels of metals in groundwater, while exceeding trigger values for copper and zinc are most likely natural background levels and do not present issues of concern relating to the application waste oil on the racetrack.
- Surface water metal levels, while exceeding copper and zinc trigger values in each case and occasionally exceeding other metals trigger levels are most likely to reflect natural background soil chemistry and do not present issues of concern relating to the application waste oil on the racetrack.

- The single incidence of a surface water sample registering presence of hydrocarbon was most likely due to its location passed through by vehicles and machinery and does not present issues of concern relating to the application waste oil on the racetrack.

## Recommendations

EPL208 is due for review and renewal in 2022. Low Ecological Services recommends the following changes to the monitoring program to improve understanding of risks to the surrounding environment and to human health that may arise from repeated applications of waste oil to the racetrack:

- Sample groundwater from an additional bore located >100m upstream of the racecourse to give a better understanding of groundwater chemistry in the surrounding area and to provide another control site for comparing monitoring bores.
- Groundwater sampling should be reduced to one sampling event within 7 days before each track treatment with waste oil. The current schedule of sampling in the two weeks prior to treatment, and again within 48 hours after track treatment, does not relate to the longer timescales needed for contaminants to leach into groundwater in an arid environment.
- If available, surface water samples should be taken from areas located well away from vehicle tracks and areas that have been treated with waste oil or where waste oil may have spilled.
- Soil sampling to determine the depth of waste oil penetration in the previous reporting period to 22 July 2020 provided baseline data on waste oil infiltration below the track surface after 43 years of repeated waste oil applications. It is recommended this monitoring is carried out biennially to determine a rate of transfer into the subsoil, to be formally required under a revised Environmental Protection Licence.
- Groundwater trigger values for field parameters provided in Attachment B- 2018/2020 of the EPL 208 should be revised as they do not appear to be relevant in this (arid zone) context.

## 9 References

Council, N. E. (2013). *National Environment Protection (Assessment of Site Contamination) Measure*.

McDonald, J. C. (1993). *A preliminary overview of groundwater quality in the Northern Territory*.  
Journal of Australian Geology and Geophysics .

Natural Resource Management Ministerial Council. (2011). *Australian Drinking Water Guidelines 6*.  
Canberra: National Health and Medical Research Council .

Office of Parliamentary Counsel. (2013). *Environmental Protection (Assessment of Site Contamination) Measure* . Canberra.

## Appendices

### 10 Appendix 1 – ALS Certificates of Analysis and Analytical Results for Groundwater Samples

Work order ES2045585 for samples taken 18 December, 2020.

Work order ES2100777 for samples taken 9 January, 2021.

Work order ES2117918 for samples taken 12 May, 2021.

Work order ES2128343 for samples taken 29 July, 2021.

### 11 Appendix 2 – ALS Certificates of Analysis and Analytical Results for Surface Water Samples

2.1 Work order ES2035182 for samples taken 6 October, 2020.

## CERTIFICATE OF ANALYSIS

**Work Order** : **ES2045585**  
**Client** : **LOW ECOLOGICAL SERVICES**  
**Contact** : MR BILL LOW  
**Address** : PO BOX 3130  
ALICE SPRINGS NT, AUSTRALIA 0871  
**Telephone** : +61 08 89 555 222  
**Project** : Alice Springs Turf Club  
**Order number** : ----  
**C-O-C number** : ----  
**Sampler** : Danesh Anita  
**Site** : ----  
**Quote number** : EN/333  
**No. of samples received** : 4  
**No. of samples analysed** : 4

**Page** : 1 of 5  
**Laboratory** : Environmental Division Sydney  
**Contact** : Customer Services ES  
**Address** : 277-289 Woodpark Road Smithfield NSW Australia 2164  
**Telephone** : +61-2-8784 8555  
**Date Samples Received** : 22-Dec-2020 13:05  
**Date Analysis Commenced** : 23-Dec-2020  
**Issue Date** : 05-Jan-2021 12:20



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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

### Signatories

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

| <i>Signatories</i> | <i>Position</i>          | <i>Accreditation Category</i>      |
|--------------------|--------------------------|------------------------------------|
| Alex Rossi         | Organic Chemist          | Sydney Organics, Smithfield, NSW   |
| Celine Conceicao   | Senior Spectroscopist    | Sydney Inorganics, Smithfield, NSW |
| Sanjeshni Jyoti    | Senior Chemist Volatiles | 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

|                                                                        |                   |        |      | RN4541            | RN18251           | RN3098            | RN18252           | ----  |
|------------------------------------------------------------------------|-------------------|--------|------|-------------------|-------------------|-------------------|-------------------|-------|
| Sampling date / time                                                   |                   |        |      | 18-Dec-2020 11:30 | 18-Dec-2020 11:50 | 18-Dec-2020 12:25 | 18-Dec-2020 12:50 | ----  |
| Compound                                                               | CAS Number        | LOR    | Unit | ES2045585-001     | ES2045585-002     | ES2045585-003     | ES2045585-004     | ----- |
|                                                                        |                   |        |      | Result            | Result            | Result            | Result            | ----  |
| <b>EG020T: Total Metals by ICP-MS</b>                                  |                   |        |      |                   |                   |                   |                   |       |
| Arsenic                                                                | 7440-38-2         | 0.001  | mg/L | <0.001            | <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            | <b>0.002</b>      | <b>0.002</b>      | ----  |
| Copper                                                                 | 7440-50-8         | 0.001  | mg/L | <0.001            | <0.001            | <b>0.002</b>      | <b>0.044</b>      | ----  |
| Nickel                                                                 | 7440-02-0         | 0.001  | mg/L | <0.001            | <b>0.002</b>      | <b>0.001</b>      | <b>0.003</b>      | ----  |
| Lead                                                                   | 7439-92-1         | 0.001  | mg/L | <0.001            | <0.001            | <b>0.002</b>      | <0.001            | ----  |
| Zinc                                                                   | 7440-66-6         | 0.005  | mg/L | <b>0.016</b>      | <b>0.037</b>      | <b>0.036</b>      | <b>0.061</b>      | ----  |
| <b>EG035T: Total Recoverable Mercury by FIMS</b>                       |                   |        |      |                   |                   |                   |                   |       |
| Mercury                                                                | 7439-97-6         | 0.0001 | mg/L | <0.0001           | <0.0001           | <0.0001           | <0.0001           | ----  |
| <b>EP080/071: Total Petroleum Hydrocarbons</b>                         |                   |        |      |                   |                   |                   |                   |       |
| 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               | ----  |
| <b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b> |                   |        |      |                   |                   |                   |                   |       |
| 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              | ----  |
| <b>EP080: BTEXN</b>                                                    |                   |        |      |                   |                   |                   |                   |       |
| 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

|                                       |            |     |      | RN4541            | RN18251           | RN3098            | RN18252           | ----  |
|---------------------------------------|------------|-----|------|-------------------|-------------------|-------------------|-------------------|-------|
| Sampling date / time                  |            |     |      | 18-Dec-2020 11:30 | 18-Dec-2020 11:50 | 18-Dec-2020 12:25 | 18-Dec-2020 12:50 | ----  |
| Compound                              | CAS Number | LOR | Unit | ES2045585-001     | ES2045585-002     | ES2045585-003     | ES2045585-004     | ----- |
|                                       |            |     |      | Result            | Result            | Result            | Result            | ----  |
| <b>EP080S: TPH(V)/BTEX Surrogates</b> |            |     |      |                   |                   |                   |                   |       |
| 1,2-Dichloroethane-D4                 | 17060-07-0 | 2   | %    | 118               | 129               | 116               | 114               | ----  |
| Toluene-D8                            | 2037-26-5  | 2   | %    | 115               | 131               | 114               | 114               | ----  |
| 4-Bromofluorobenzene                  | 460-00-4   | 2   | %    | 109               | 119               | 110               | 110               | ----  |



## Surrogate Control Limits

Sub-Matrix: **WATER**

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

## CERTIFICATE OF ANALYSIS

**Work Order** : **ES2100777**  
**Client** : **LOW ECOLOGICAL SERVICES**  
**Contact** : **MAC MOYSES**  
**Address** : **PO BOX 3130**  
**ALICE SPRINGS NT, AUSTRALIA 0871**  
**Telephone** : **----**  
**Project** : **Alice Springs Turf Club**  
**Order number** : **----**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **EN/333**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : 1 of 5  
**Laboratory** : Environmental Division Sydney  
**Contact** : Customer Services ES  
**Address** : 277-289 Woodpark Road Smithfield NSW Australia 2164  
**Telephone** : +61-2-8784 8555  
**Date Samples Received** : 12-Jan-2021 09:00  
**Date Analysis Commenced** : 12-Jan-2021  
**Issue Date** : 18-Jan-2021 17:03



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.

| Signatories      | Position              | Accreditation Category             |
|------------------|-----------------------|------------------------------------|
| Celine Conceicao | Senior Spectroscopist | 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

|                                                                        |                   |        |      | RN4541            | RN18251           | RN3098            | RN18252           | ----  |
|------------------------------------------------------------------------|-------------------|--------|------|-------------------|-------------------|-------------------|-------------------|-------|
| Sampling date / time                                                   |                   |        |      | 09-Jan-2021 00:00 | 09-Jan-2021 00:00 | 09-Jan-2021 00:00 | 09-Jan-2021 00:00 | ----  |
| Compound                                                               | CAS Number        | LOR    | Unit | ES2100777-001     | ES2100777-002     | ES2100777-003     | ES2100777-004     | ----- |
|                                                                        |                   |        |      | Result            | Result            | Result            | Result            | ----  |
| <b>EG020T: Total Metals by ICP-MS</b>                                  |                   |        |      |                   |                   |                   |                   |       |
| Arsenic                                                                | 7440-38-2         | 0.001  | mg/L | <0.001            | <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 | <b>0.004</b>      | <0.001            | <b>0.002</b>      | <0.001            | ----  |
| Copper                                                                 | 7440-50-8         | 0.001  | mg/L | <b>0.003</b>      | <0.001            | <b>0.002</b>      | <b>0.023</b>      | ----  |
| Nickel                                                                 | 7440-02-0         | 0.001  | mg/L | <b>0.007</b>      | <b>0.002</b>      | <b>0.001</b>      | <b>0.003</b>      | ----  |
| Lead                                                                   | 7439-92-1         | 0.001  | mg/L | <b>0.002</b>      | <0.001            | <0.001            | <0.001            | ----  |
| Zinc                                                                   | 7440-66-6         | 0.005  | mg/L | <b>0.053</b>      | <b>0.028</b>      | <b>0.040</b>      | <b>0.030</b>      | ----  |
| <b>EG035T: Total Recoverable Mercury by FIMS</b>                       |                   |        |      |                   |                   |                   |                   |       |
| Mercury                                                                | 7439-97-6         | 0.0001 | mg/L | <0.0001           | <0.0001           | <0.0001           | <0.0001           | ----  |
| <b>EP080/071: Total Petroleum Hydrocarbons</b>                         |                   |        |      |                   |                   |                   |                   |       |
| 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               | ----  |
| <b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b> |                   |        |      |                   |                   |                   |                   |       |
| 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              | ----  |
| <b>EP080: BTEXN</b>                                                    |                   |        |      |                   |                   |                   |                   |       |
| 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

|                                       |            |     |      | RN4541            | RN18251           | RN3098            | RN18252           | ----  |
|---------------------------------------|------------|-----|------|-------------------|-------------------|-------------------|-------------------|-------|
| Sampling date / time                  |            |     |      | 09-Jan-2021 00:00 | 09-Jan-2021 00:00 | 09-Jan-2021 00:00 | 09-Jan-2021 00:00 | ----  |
| Compound                              | CAS Number | LOR | Unit | ES2100777-001     | ES2100777-002     | ES2100777-003     | ES2100777-004     | ----- |
|                                       |            |     |      | Result            | Result            | Result            | Result            | ----  |
| <b>EP080S: TPH(V)/BTEX Surrogates</b> |            |     |      |                   |                   |                   |                   |       |
| 1,2-Dichloroethane-D4                 | 17060-07-0 | 2   | %    | 136               | 124               | 126               | 132               | ----  |
| Toluene-D8                            | 2037-26-5  | 2   | %    | 108               | 109               | 108               | 110               | ----  |
| 4-Bromofluorobenzene                  | 460-00-4   | 2   | %    | 115               | 112               | 113               | 112               | ----  |



## Surrogate Control Limits

Sub-Matrix: **WATER**

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

## CERTIFICATE OF ANALYSIS

**Work Order** : **ES2117918**  
**Client** : **LOW ECOLOGICAL SERVICES**  
**Contact** : **MAC MOYSES**  
**Address** : **PO BOX 3130**  
**ALICE SPRINGS NT, AUSTRALIA 0871**  
**Telephone** : **----**  
**Project** : **Turf Club**  
**Order number** : **----**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **EN/333**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : 1 of 5  
**Laboratory** : Environmental Division Sydney  
**Contact** : Customer Services ES  
**Address** : 277-289 Woodpark Road Smithfield NSW Australia 2164  
**Telephone** : +61-2-8784 8555  
**Date Samples Received** : 13-May-2021 09:00  
**Date Analysis Commenced** : 17-May-2021  
**Issue Date** : 20-May-2021 14:26



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

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

| Signatories     | Position            | Accreditation Category             |
|-----------------|---------------------|------------------------------------|
| 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: WATER  
 (Matrix: WATER)

Sample ID

|                                                                        |                   |        |      | RN 04541          | RN 018251         | RN 03098          | RN 18252          | ----  |
|------------------------------------------------------------------------|-------------------|--------|------|-------------------|-------------------|-------------------|-------------------|-------|
| Sampling date / time                                                   |                   |        |      | 12-May-2021 10:00 | 12-May-2021 10:50 | 12-May-2021 11:30 | 12-May-2021 12:40 | ----  |
| Compound                                                               | CAS Number        | LOR    | Unit | ES2117918-001     | ES2117918-002     | ES2117918-003     | ES2117918-004     | ----- |
|                                                                        |                   |        |      | Result            | Result            | Result            | Result            | ----  |
| <b>EG020T: Total Metals by ICP-MS</b>                                  |                   |        |      |                   |                   |                   |                   |       |
| Arsenic                                                                | 7440-38-2         | 0.001  | mg/L | <0.001            | <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            | 0.001             | <0.001            | 0.007             | ----  |
| Nickel                                                                 | 7440-02-0         | 0.001  | mg/L | <0.001            | 0.002             | <0.001            | 0.002             | ----  |
| Lead                                                                   | 7439-92-1         | 0.001  | mg/L | <0.001            | <0.001            | 0.001             | <0.001            | ----  |
| Zinc                                                                   | 7440-66-6         | 0.005  | mg/L | 0.006             | 0.038             | 0.012             | 0.014             | ----  |
| <b>EG035T: Total Recoverable Mercury by FIMS</b>                       |                   |        |      |                   |                   |                   |                   |       |
| Mercury                                                                | 7439-97-6         | 0.0001 | mg/L | <0.0001           | <0.0001           | <0.0001           | <0.0001           | ----  |
| <b>EP080/071: Total Petroleum Hydrocarbons</b>                         |                   |        |      |                   |                   |                   |                   |       |
| 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               | ----  |
| <b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b> |                   |        |      |                   |                   |                   |                   |       |
| 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              | ----  |
| <b>EP080: BTEXN</b>                                                    |                   |        |      |                   |                   |                   |                   |       |
| 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

|                                       |            |     |      | RN 04541          | RN 018251         | RN 03098          | RN 18252          | ----  |
|---------------------------------------|------------|-----|------|-------------------|-------------------|-------------------|-------------------|-------|
| Sampling date / time                  |            |     |      | 12-May-2021 10:00 | 12-May-2021 10:50 | 12-May-2021 11:30 | 12-May-2021 12:40 | ----  |
| Compound                              | CAS Number | LOR | Unit | ES2117918-001     | ES2117918-002     | ES2117918-003     | ES2117918-004     | ----- |
|                                       |            |     |      | Result            | Result            | Result            | Result            | ----  |
| <b>EP080S: TPH(V)/BTEX Surrogates</b> |            |     |      |                   |                   |                   |                   |       |
| <b>1,2-Dichloroethane-D4</b>          | 17060-07-0 | 2   | %    | <b>101</b>        | <b>107</b>        | <b>104</b>        | <b>94.6</b>       | ----  |
| <b>Toluene-D8</b>                     | 2037-26-5  | 2   | %    | <b>101</b>        | <b>102</b>        | <b>95.9</b>       | <b>102</b>        | ----  |
| <b>4-Bromofluorobenzene</b>           | 460-00-4   | 2   | %    | <b>101</b>        | <b>102</b>        | <b>97.9</b>       | <b>97.4</b>       | ----  |



## Surrogate Control Limits

Sub-Matrix: **WATER**

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

## CERTIFICATE OF ANALYSIS

**Work Order** : **ES2128343**  
**Client** : **LOW ECOLOGICAL SERVICES**  
**Contact** : MR BILL LOW  
**Address** : PO BOX 3130  
ALICE SPRINGS NT, AUSTRALIA 0871  
**Telephone** : +61 08 89 555 222  
**Project** : Turf Club  
**Order number** : KD20219729  
**C-O-C number** : ----  
**Sampler** : ----  
**Site** : ----  
**Quote number** : EN/333  
**No. of samples received** : 4  
**No. of samples analysed** : 4

**Page** : 1 of 5  
**Laboratory** : Environmental Division Sydney  
**Contact** : Customer Services ES  
**Address** : 277-289 Woodpark Road Smithfield NSW Australia 2164  
**Telephone** : +61-2-8784 8555  
**Date Samples Received** : 05-Aug-2021 07:00  
**Date Analysis Commenced** : 09-Aug-2021  
**Issue Date** : 12-Aug-2021 13:58



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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

### Signatories

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

| <i>Signatories</i> | <i>Position</i>          | <i>Accreditation Category</i>      |
|--------------------|--------------------------|------------------------------------|
| Alex Rossi         | Organic Chemist          | Sydney Organics, Smithfield, NSW   |
| Ivan Taylor        | Analyst                  | Sydney Inorganics, Smithfield, NSW |
| Sanjeshni Jyoti    | Senior Chemist Volatiles | 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

|                                                                        |                   |        |      | RN4541            | RN018251          | RN3098            | RN18252           | ----  |
|------------------------------------------------------------------------|-------------------|--------|------|-------------------|-------------------|-------------------|-------------------|-------|
| Sampling date / time                                                   |                   |        |      | 29-Jul-2021 12:10 | 29-Jul-2021 13:10 | 29-Jul-2021 13:45 | 29-Jul-2021 14:30 | ----  |
| Compound                                                               | CAS Number        | LOR    | Unit | ES2128343-001     | ES2128343-002     | ES2128343-003     | ES2128343-004     | ----- |
|                                                                        |                   |        |      | Result            | Result            | Result            | Result            | ----  |
| <b>EG020T: Total Metals by ICP-MS</b>                                  |                   |        |      |                   |                   |                   |                   |       |
| Arsenic                                                                | 7440-38-2         | 0.001  | mg/L | <0.001            | <0.001            | <0.001            | <0.001            | ----  |
| Cadmium                                                                | 7440-43-9         | 0.0001 | mg/L | 0.0002            | <0.0001           | <0.0001           | <0.0001           | ----  |
| Chromium                                                               | 7440-47-3         | 0.001  | mg/L | <0.001            | <0.001            | <0.001            | 0.002             | ----  |
| Copper                                                                 | 7440-50-8         | 0.001  | mg/L | 0.007             | 0.005             | 0.006             | 0.012             | ----  |
| Nickel                                                                 | 7440-02-0         | 0.001  | mg/L | 0.002             | 0.004             | 0.003             | 0.005             | ----  |
| Lead                                                                   | 7439-92-1         | 0.001  | mg/L | <0.001            | 0.001             | 0.001             | 0.001             | ----  |
| Zinc                                                                   | 7440-66-6         | 0.005  | mg/L | 0.016             | 0.086             | 0.008             | 0.040             | ----  |
| <b>EG035T: Total Recoverable Mercury by FIMS</b>                       |                   |        |      |                   |                   |                   |                   |       |
| Mercury                                                                | 7439-97-6         | 0.0001 | mg/L | <0.0001           | <0.0001           | <0.0001           | <0.0001           | ----  |
| <b>EP080/071: Total Petroleum Hydrocarbons</b>                         |                   |        |      |                   |                   |                   |                   |       |
| 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               | ----  |
| <b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b> |                   |        |      |                   |                   |                   |                   |       |
| 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              | ----  |
| <b>EP080: BTEXN</b>                                                    |                   |        |      |                   |                   |                   |                   |       |
| 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

|                                       |            |     |      | RN4541            | RN018251          | RN3098            | RN18252           | ----  |
|---------------------------------------|------------|-----|------|-------------------|-------------------|-------------------|-------------------|-------|
| Sampling date / time                  |            |     |      | 29-Jul-2021 12:10 | 29-Jul-2021 13:10 | 29-Jul-2021 13:45 | 29-Jul-2021 14:30 | ----  |
| Compound                              | CAS Number | LOR | Unit | ES2128343-001     | ES2128343-002     | ES2128343-003     | ES2128343-004     | ----- |
|                                       |            |     |      | Result            | Result            | Result            | Result            | ----  |
| <b>EP080S: TPH(V)/BTEX Surrogates</b> |            |     |      |                   |                   |                   |                   |       |
| 1,2-Dichloroethane-D4                 | 17060-07-0 | 2   | %    | 94.3              | 83.2              | 95.4              | 95.9              | ----  |
| Toluene-D8                            | 2037-26-5  | 2   | %    | 107               | 85.4              | 109               | 104               | ----  |
| 4-Bromofluorobenzene                  | 460-00-4   | 2   | %    | 107               | 81.4              | 106               | 103               | ----  |

Page : 5 of 5  
Work Order : ES2128343  
Client : LOW ECOLOGICAL SERVICES  
Project : Turf Club



## Surrogate Control Limits

Sub-Matrix: **WATER**

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

## CERTIFICATE OF ANALYSIS

**Work Order** : **ES2035182**  
**Client** : **LOW ECOLOGICAL SERVICES**  
**Contact** : **MAC MOYSES**  
**Address** : **PO BOX 3130**  
**ALICE SPRINGS NT, AUSTRALIA 0871**  
**Telephone** : **----**  
**Project** : **Alice Springs Turf Club**  
**Order number** : **----**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **EN/333**  
**No. of samples received** : **5**  
**No. of samples analysed** : **5**

**Page** : 1 of 5  
**Laboratory** : Environmental Division Sydney  
**Contact** : Customer Services ES  
**Address** : 277-289 Woodpark Road Smithfield NSW Australia 2164  
**Telephone** : +61-2-8784 8555  
**Date Samples Received** : 08-Oct-2020 09:05  
**Date Analysis Commenced** : 09-Oct-2020  
**Issue Date** : 15-Oct-2020 14:27



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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- 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.

| Signatories     | Position            | Accreditation Category             |
|-----------------|---------------------|------------------------------------|
| 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.

- EP075 (SIM): Where reported, Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.



## Analytical Results

Sub-Matrix: WATER  
 (Matrix: WATER)

Client sample ID

|                                                       |                   |        |      | SW08_TC           | SW06_TC           | SW09_TC           | SW01_TC           | SW05_TC           |
|-------------------------------------------------------|-------------------|--------|------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Client sampling date / time                           |                   |        |      | 06-Oct-2020 00:00 | 06-Oct-2020 00:00 | 06-Oct-2020 00:00 | 06-Oct-2020 00:00 | 06-Oct-2020 00:00 |
| Compound                                              | CAS Number        | LOR    | Unit | ES2035182-001     | ES2035182-002     | ES2035182-003     | ES2035182-004     | ES2035182-005     |
|                                                       |                   |        |      | Result            | Result            | Result            | Result            | Result            |
| <b>EG020T: Total Metals by ICP-MS</b>                 |                   |        |      |                   |                   |                   |                   |                   |
| Arsenic                                               | 7440-38-2         | 0.001  | mg/L | <0.001            | <0.001            | <0.001            | <0.001            | <0.001            |
| Cadmium                                               | 7440-43-9         | 0.0001 | mg/L | <0.0001           | <0.0001           | <0.0001           | <0.0001           | <0.0001           |
| Chromium                                              | 7440-47-3         | 0.001  | mg/L | <0.001            | 0.013             | 0.027             | 0.007             | 0.002             |
| Copper                                                | 7440-50-8         | 0.001  | mg/L | 0.002             | 0.009             | 0.018             | 0.010             | 0.004             |
| Lead                                                  | 7439-92-1         | 0.001  | mg/L | 0.001             | 0.007             | 0.015             | 0.006             | 0.001             |
| Nickel                                                | 7440-02-0         | 0.001  | mg/L | <0.001            | 0.006             | 0.014             | 0.004             | 0.002             |
| Zinc                                                  | 7440-66-6         | 0.005  | mg/L | 0.023             | 0.030             | 0.052             | 0.030             | 0.040             |
| <b>EG035T: Total Recoverable Mercury by FIMS</b>      |                   |        |      |                   |                   |                   |                   |                   |
| Mercury                                               | 7439-97-6         | 0.0001 | mg/L | <0.0001           | <0.0001           | <0.0001           | <0.0001           | <0.0001           |
| <b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons</b> |                   |        |      |                   |                   |                   |                   |                   |
| Naphthalene                                           | 91-20-3           | 1.0    | µg/L | <1.0              | <1.0              | <1.0              | <1.0              | <1.0              |
| Acenaphthylene                                        | 208-96-8          | 1.0    | µg/L | <1.0              | <1.0              | <1.0              | <1.0              | <1.0              |
| Acenaphthene                                          | 83-32-9           | 1.0    | µg/L | <1.0              | <1.0              | <1.0              | <1.0              | <1.0              |
| Fluorene                                              | 86-73-7           | 1.0    | µg/L | <1.0              | <1.0              | <1.0              | <1.0              | <1.0              |
| Phenanthrene                                          | 85-01-8           | 1.0    | µg/L | <1.0              | <1.0              | <1.0              | <1.0              | <1.0              |
| Anthracene                                            | 120-12-7          | 1.0    | µg/L | <1.0              | <1.0              | <1.0              | <1.0              | <1.0              |
| Fluoranthene                                          | 206-44-0          | 1.0    | µg/L | <1.0              | <1.0              | <1.0              | <1.0              | <1.0              |
| Pyrene                                                | 129-00-0          | 1.0    | µg/L | <1.0              | <1.0              | <1.0              | <1.0              | <1.0              |
| Benzo(a)anthracene                                    | 56-55-3           | 1.0    | µg/L | <1.0              | <1.0              | <1.0              | <1.0              | <1.0              |
| Chrysene                                              | 218-01-9          | 1.0    | µg/L | <1.0              | <1.0              | <1.0              | <1.0              | <1.0              |
| Benzo(b+j)fluoranthene                                | 205-99-2 205-82-3 | 1.0    | µg/L | <1.0              | <1.0              | <1.0              | <1.0              | <1.0              |
| Benzo(k)fluoranthene                                  | 207-08-9          | 1.0    | µg/L | <1.0              | <1.0              | <1.0              | <1.0              | <1.0              |
| Benzo(a)pyrene                                        | 50-32-8           | 0.5    | µg/L | <0.5              | <0.5              | <0.5              | <0.5              | <0.5              |
| Indeno(1.2.3.cd)pyrene                                | 193-39-5          | 1.0    | µg/L | <1.0              | <1.0              | <1.0              | <1.0              | <1.0              |
| Dibenz(a.h)anthracene                                 | 53-70-3           | 1.0    | µg/L | <1.0              | <1.0              | <1.0              | <1.0              | <1.0              |
| Benzo(g,h,i)perylene                                  | 191-24-2          | 1.0    | µg/L | <1.0              | <1.0              | <1.0              | <1.0              | <1.0              |
| ^ Sum of polycyclic aromatic hydrocarbons             | ----              | 0.5    | µg/L | <0.5              | <0.5              | <0.5              | <0.5              | <0.5              |
| ^ Benzo(a)pyrene TEQ (zero)                           | ----              | 0.5    | µg/L | <0.5              | <0.5              | <0.5              | <0.5              | <0.5              |
| <b>EP080/071: Total Petroleum Hydrocarbons</b>        |                   |        |      |                   |                   |                   |                   |                   |
| C6 - C9 Fraction                                      | ----              | 20     | µg/L | <20               | <20               | <20               | <20               | <20               |
| C10 - C14 Fraction                                    | ----              | 50     | µg/L | 180               | <50               | <50               | <50               | 150               |
| C15 - C28 Fraction                                    | ----              | 100    | µg/L | 110               | <100              | <100              | <100              | 670               |
| C29 - C36 Fraction                                    | ----              | 50     | µg/L | <50               | <50               | <50               | <50               | 200               |
| ^ C10 - C36 Fraction (sum)                            | ----              | 50     | µg/L | 290               | <50               | <50               | <50               | 1020              |



## Analytical Results

Sub-Matrix: WATER  
 (Matrix: WATER)

Client sample ID

|                                                                        |                   |     |      | SW08_TC           | SW06_TC           | SW09_TC           | SW01_TC           | SW05_TC           |
|------------------------------------------------------------------------|-------------------|-----|------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Client sampling date / time                                            |                   |     |      | 06-Oct-2020 00:00 | 06-Oct-2020 00:00 | 06-Oct-2020 00:00 | 06-Oct-2020 00:00 | 06-Oct-2020 00:00 |
| Compound                                                               | CAS Number        | LOR | Unit | ES2035182-001     | ES2035182-002     | ES2035182-003     | ES2035182-004     | ES2035182-005     |
|                                                                        |                   |     |      | Result            | Result            | Result            | Result            | Result            |
| <b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b> |                   |     |      |                   |                   |                   |                   |                   |
| 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 | 210               | <100              | <100              | <100              | 240               |
| >C16 - C34 Fraction                                                    | ----              | 100 | µg/L | <100              | <100              | <100              | <100              | 740               |
| >C34 - C40 Fraction                                                    | ----              | 100 | µg/L | <100              | <100              | <100              | <100              | <100              |
| ^ >C10 - C40 Fraction (sum)                                            | ----              | 100 | µg/L | 210               | <100              | <100              | <100              | 980               |
| ^ >C10 - C16 Fraction minus Naphthalene (F2)                           | ----              | 100 | µg/L | 210               | <100              | <100              | <100              | 240               |
| <b>EP080: BTEXN</b>                                                    |                   |     |      |                   |                   |                   |                   |                   |
| 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                |
| <b>EP075(SIM)S: Phenolic Compound Surrogates</b>                       |                   |     |      |                   |                   |                   |                   |                   |
| Phenol-d6                                                              | 13127-88-3        | 1.0 | %    | 20.6              | 17.1              | 17.4              | 20.3              | 17.7              |
| 2-Chlorophenol-D4                                                      | 93951-73-6        | 1.0 | %    | 62.9              | 51.6              | 41.4              | 57.7              | 37.3              |
| 2,4,6-Tribromophenol                                                   | 118-79-6          | 1.0 | %    | 62.8              | 57.7              | 56.2              | 81.3              | 70.2              |
| <b>EP075(SIM)T: PAH Surrogates</b>                                     |                   |     |      |                   |                   |                   |                   |                   |
| 2-Fluorobiphenyl                                                       | 321-60-8          | 1.0 | %    | 89.2              | 73.8              | 60.8              | 98.0              | 54.5              |
| Anthracene-d10                                                         | 1719-06-8         | 1.0 | %    | 69.2              | 62.5              | 73.9              | 67.1              | 61.4              |
| 4-Terphenyl-d14                                                        | 1718-51-0         | 1.0 | %    | 87.2              | 82.1              | 85.4              | 97.8              | 83.2              |
| <b>EP080S: TPH(V)/BTEX Surrogates</b>                                  |                   |     |      |                   |                   |                   |                   |                   |
| 1,2-Dichloroethane-D4                                                  | 17060-07-0        | 2   | %    | 116               | 120               | 118               | 117               | 124               |
| Toluene-D8                                                             | 2037-26-5         | 2   | %    | 106               | 110               | 104               | 105               | 117               |
| 4-Bromofluorobenzene                                                   | 460-00-4          | 2   | %    | 98.9              | 99.8              | 95.5              | 97.9              | 103               |



## Surrogate Control Limits

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