RCA AUSTRALIA
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Geotechnical Engineering
Engineering Geology
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Construction Materials Testing
Environmental Monitoring
Sound & Vibration
Occupational Hygiene

RCA ref 14302-755/0

31 August 2023

Johnson Property Group
Corner of Whistler Drive & Armitage Way
Cooranbong NSW 2265

Attention: Mr Michael Wratten

# JULY 2023 GROUNDWATER AND SEDIMENT SAMPLING TRINITY POINT MARINA, MORISSET PARK

## 1 INTRODUCTION

This report details the findings of groundwater and sediment sampling conducted at the Trinity Point Marina, Morisset Park NSW.

The sampling was undertaken to comply with the requirements for monitoring outlined in Sections 2.4 and 2.5 of the Construction Environmental Management Plan (CEMP, Ref [1]) for the Marina as detailed below.

Section 2.4 of the CEMP states that groundwater monitoring is to be undertaken upstream and downstream of the Underground Petroleum Storage System (UPSS) at points 'E' and 'F' as per the site Environment Protection Licence (EPL) No 20631. The groundwater monitoring locations are shown below on **Figure 1**, as extracted from the "EPL Boundary and Water Quality Sampling Points" plan provided as part of the Environmental Monitoring information on the Trinity Point Marina website (https://trinitypointmarina.com.au/about/trinity-point-marina-monitoring). Monthly groundwater monitoring, which is undertaken separately, involves the inspection of groundwater for visual assessment of the presence of oil and grease. Annual groundwater monitoring, which forms part of the scope of this assessment, requires collected samples to be analysed for total petroleum hydrocarbons (TPH). It is noted that **Figure 1** includes surface water monitoring locations, assessment of which are not included in this report.

Section 2.5 of the CEMP (Ref [1]) states that Section C13 of the Concept Approval for the Marina requires that analysis of contaminant levels in the bed sediments in the area of the proposed marina is undertaken as part of the Stage 1 Marina Environmental Performance Monitoring. The CEMP (Ref [1]) states that an assessment of baseline sediment quality data indicated that lake bed sediments at the site are generally not contaminated, although slightly elevated concentrations of arsenic and cadmium have been detected. Sediment samples were required to be collected once midway through the Stage 1 construction period and then annually for a maximum of five (5) years following commencement of operation to demonstrate that marina operations do not impact sediment quality conditions. The CEMP (Ref [1]) states that the sediment samples are to be collected from four (4) 'impact' locations within the current marina layout as were assessed during the baseline monitoring period with an additional two (2) locations positioned in adjacent non-impacted areas to provide reference data for the four (4) 'impact' locations. The two (2) non-impacted sediment locations are identified as EPL Point A and Point C on **Figure 1** below. The four (4) sediment sampling locations as extracted from the CEMP (Ref [1]) are presented on **Figure 2**.

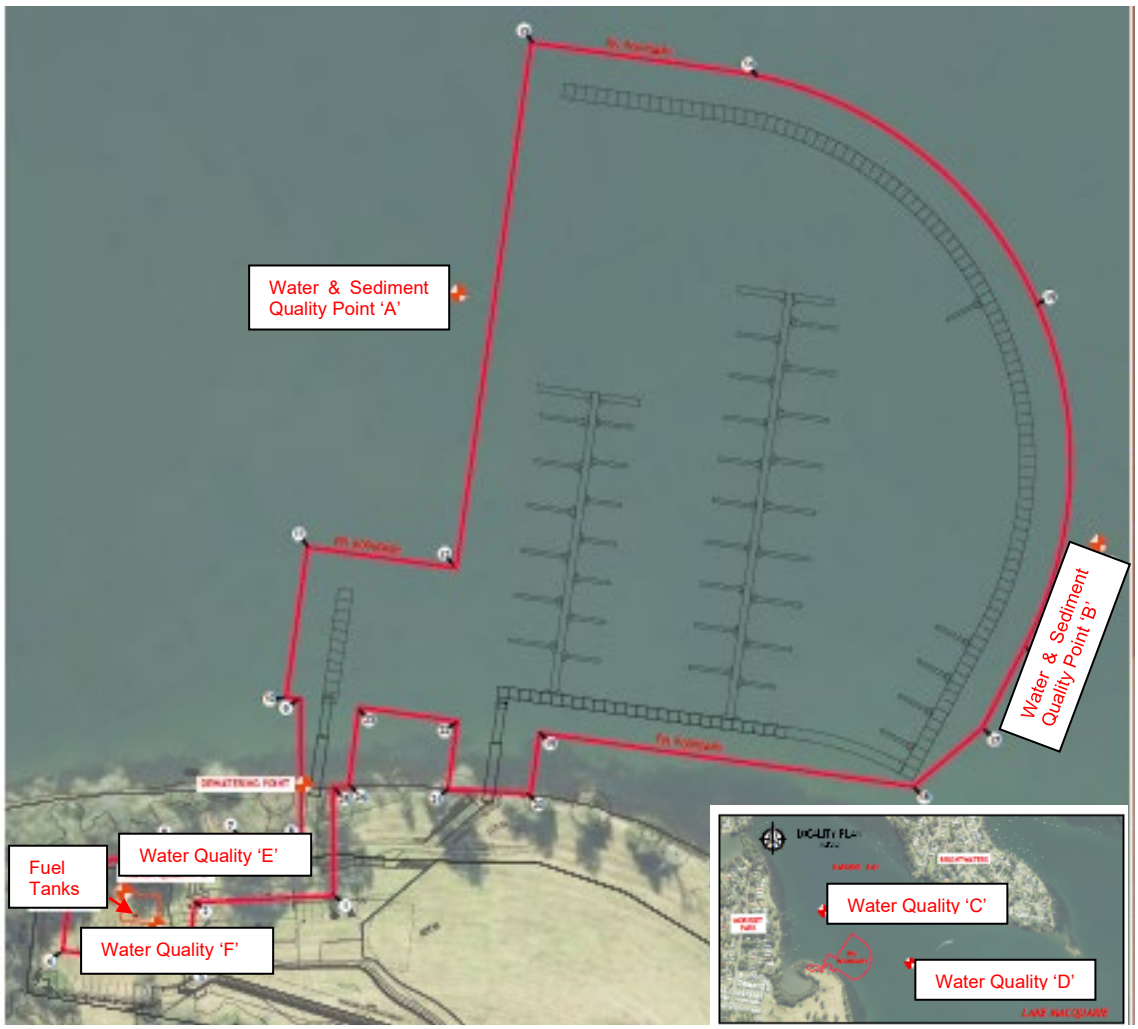


**Figure 1** *Trinity Point Marina "EPL Boundary and Water Quality Sampling Points" showing groundwater, surface water and sediment sampling locations.*


**Figure 2** *Extract from CEMP (Ref [1]) identifying sediment 'impact' locations.*

It is understood that this round of monitoring comprises the second of the post construction annual monitoring events. RCA have been provided with the results of sediment sampling conducted by Enviropacific in April 2019 (Ref [2]) which RCA understands were collected to establish background contaminant levels present proximal to the marina prior to occupation and these have been used in RCA's assessment.

## 2 FIELDWORK

An environmental technician undertook the fieldwork on 19 July 2023. The scope of work included:

- The collection of groundwater samples from existing monitoring wells MW5 and MW6 which are identified as points 'E' and 'F' in the site EPL as shown above in **Figure 1**.
    - Both bores were dipped to determine the depth of groundwater and then purged of at least three (3) bore volumes prior to sample collection.

  - Samples were collected by designated hand bailer and were analysed by a NATA accredited laboratory for total recoverable hydrocarbons (TRH[1]) and benzene, toluene, ethylbenzene, xylene (BTEX).

- The collection of six (6) sediment samples comprising the four (4) sediment sample locations identified in the CEMP as shown on **Figure 2** and two (2) sediment samples from a boat within Lake Macquarie at EPL Points A and C as shown on **Figure 1**.

  - All sediment samples were collected with a (Petite) Ponar sampler which facilitates the collection of sediment samples from below the water. The samples were collected from the surface of the sediment to approximately 0.1m below the surface.

  - Samples were analysed by a NATA accredited laboratory for metals, total organic carbon (TOC) and tributyl tin (TBT) as specified in the CEMP (Ref [1]).

There were no other indications of contamination observed during sampling of groundwater or sediment.

Field sheets are attached.

## 3 APPLICABLE GUIDELINE CRITERIA

### 3.1 GROUNDWATER

The Guidelines for the Assessment and Management of Groundwater Contamination have been introduced by the NSW DECC (Ref [3]) and recommend that AWQ Guidelines (Ref [4]) investigation levels be adopted as groundwater investigation levels (GIL) for aquatic ecosystems and ADWG (Ref [5]) for drinking water GIL. It is noted that the AWQ Guidelines (Ref [4]) have since been replaced by ANZG (Ref [6]) and as such RCA have used the most recent guidelines in accordance with the following information.

The ANZG (Ref [6]) are complex guidelines that consider not only the level of protection (e.g. 99% or 95%) but also the state of the receiving water (e.g. moderately disturbed). For the protection of aquatic ecosystems the DECC recommend the use of 95% protection for all analytes with the exception of carcinogenic analytes for which the 99% protection value should be used. The following comments are additionally made:

- Where the existing generic GIL is below the naturally occurring background concentration of a particular contaminant, the background concentration becomes the default GIL.

[1] Laboratory analysis of hydrocarbons is reported as total recoverable hydrocarbons (TRH). This testing method includes all forms of hydrocarbons, not just petroleum hydrocarbons and therefore can be considered a conservative measure against the chosen TPH criteria. Further laboratory analysis using a silica gel clean up ($TRH_{sg}$) is considered to enable a better identification of the extent of petroleum based contamination

- Where PQL are greater than the recommended GIL the PQL is adopted as the GIL. Where background concentrations are proven to be greater than the GIL, the background concentration is adopted as the GIL.

- Where there is insufficient data for the derivation of marine water criteria it is allowable to use fresh water criteria as low reliability criteria.

RCA considers that the receiving water is Lake Macquarie and so has used the 95% marine water guideline criteria.

The ADWG (Ref [5]) document provides a framework for drinking water quality management and assessment. The framework provided in this document has been adopted for the evaluation of contaminants in groundwater where groundwater can be, or is being, extracted and used for drinking water purpose. It is not considered likely that groundwater would be extracted from use and as such this comparison is considered highly conservative.

Schedule B1 of the ASC NEPM (Ref [7]) provides generic health screening levels (HSL) for groundwater, for protection of human health from petroleum hydrocarbon vapours, based on the following land use scenarios:

- HSL 'A' Residential with garden/ accessible soil (home grown produce <10% fruit and vegetable intake (no poultry). This category includes children's day care centres, preschools and primary schools.

- HSL 'B' Residential with minimal opportunities for soil access includes dwellings with fully and permanently paved yard space such as high rise buildings and flats.

- HSL 'C' Public open space such as parks, playgrounds, playing fields (e.g. ovals) secondary schools and footpaths. It does not include undeveloped public open space (such as urban bushland and reserves).

- HSL 'D' Commercial/industrial such as shops, offices, factories and industrial sites.

RCA considers that the marina comprises both public open space and commercial/industrial areas: the HSL 'D' criteria presume that there is some potential for accumulation of vapours within enclosed spaces. For the purpose of this assessment the HSL 'D' criteria which are the most conservative have been used for this assessment.

It is noted that the HSL apply to groundwater at 2m below the surface. Both monitoring wells had shallower groundwater depth and as such the HSL are not directly applicable.

### 3.2 SEDIMENT

Two (2) criteria for the assessment of sediment are listed in Table 1 of the ANZG toxicant default guideline values for sediment quality (Ref [6]). The default guideline values (DGV) indicate the concentrations below which there is a low risk of unacceptable effects occurring, and should be used, with other lines of evidence, to protect aquatic ecosystems where the DGV is exceeded or where toxicant concentrations in the sediment are trending towards the DGV. The 'upper' guideline values (GV-High) provide an indication of concentrations at which toxicity-related adverse effects would be expected to be observed. The ANZG (Ref [6]) states that the GV-High value should only be used as an indicator of potential high-level toxicity problems, not as a guideline value to ensure protection of ecosystems.

## 4 RESULTS

Results have been compared against the guidelines detailed in the previous section and are presented in the tables attached to this report. A summary is as follows:

- All TRH and BTEX concentrations in groundwater were below the laboratory limit of detection and were therefore below the relevant guideline human health and ecological criteria.
- Sed-1 and Sed 4 sampling site had exceeded the DGV limit for copper but did not exceed the GV-High limit. This was the only exceedance from all the samples.
- Concentrations of metals and TBT in all sediment samples were below the default guideline values.
- Results of total organic carbon were low and relatively consistent across all samples. The samples from the 'impact' locations were slightly higher than those from 'non-impact' locations. There are no guidelines for total organic carbon.
- The trend for Aluminium and iron has indicated it is increasing in the sediment across all sites most significant was Sed 4 with increasing nearly three times from the previous year..

Laboratory report sheets are attached.

## 5 DISCUSSION AND CONCLUSION

The concentrations observed in the groundwater samples upgradient and downgradient of the UPSS were all below the laboratory detection limit and indicate that there has been no detectable impact to the groundwater from the UPSS.

Whilst the July 2023 results show a general increase in most metals concentrations, the concentrations reported in the sediment samples were all below the default guideline values the exception to this was Sed 1 and 4 both were just above the default guideline value however, were below the upper guideline value and as such not considered to be potential for adverse environmental impact from the concentrations.

The cause of increased concentrations is unknown and may be related to sediment movement within Lake Macquarie, new sediment being deposited on the base of the Lake from flood events (see below rainfall comparison statistics from the previous years) or different sampling methodology between events. It is not considered that there would be significant biodegradation effects for the analysed compounds.

There is clear evidence from January to July 2021 in comparison to Jan to July 2022 of significant elevated rainfall. Rainfall levels for 2023 have returned to near average levels as demonstrated in the below table this identifies potential increase in sediment movement previous two years minimising potential of sediment movement over 2022-2023..

| Statistics | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rainfall (mm) for year 2021** | ***104.8*** | ***155.8*** | ***421.6*** | ***56.4*** | ***26*** | ***42.8*** | ***29.2*** | ***64.8*** | ***32.6*** | ***70*** | ***234.6*** | ***105*** |
| **Rainfall (mm) for year 2022** | ***152.2*** | ***247.6*** | ***425.8*** | ***117.6*** | ***103.4*** | ***11*** | ***402.8*** | ***37.8*** | ***133.2*** | ***191.4*** | ***41.2*** | ***30.4*** |
| **Rainfall (mm) for year 2023** | **124.6** | **90.8** | **101.4** | **113.8** | **52** | **7.6** | **31.4** | **61.6** | **not available** | **not available** | **not available** | **not available** |
| Mean rainfall (mm) for years 2008 to 2023 | 114.4 | 140.2 | 166.4 | 93.9 | 47.5 | 94.5 | 71.7 | 48.7 | 58.7 | 89.3 | 107.0 | 84.9 |

Results of the sampling points do not exceed the guidelines and therefore, do not pose a risk

Based on these results RCA makes no further recommendations than the next annual monitoring event be undertaken as per the requirements of the CEMP (Ref [1]).

Yours faithfully
**RCA AUSTRALIA**

Laura Schofield
Environmental Laboratory Manager

**ATTACHMENTS**
Field Sheets

Summary of Results
Laboratory Report Sheets

## REFERENCES

[1] Haskoning Australia Pty Ltd, *Trinity Point Marina – CEMP*, December 2015

[2] Enviropacfic, *Annual Sediment Sampling and analysis Report*, January 2021

[3] DECC, *Contaminated Sites – Guidelines for the Assessment and Management of Contaminated Groundwater*, March 2007.

[4] ANZECC, *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, October 2000.

[5] ANZG, *Australian and New Zealand Guidelines for Fresh and Marine Water Quality Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia.,* August 2018. Available at www.waterquality.gov.au/anz-guidelines.

[6] National Health and Medical Research Council, *Australian Drinking Water Guidelines*, 2011.

NEPC, *National Environment Protection (Assessment of Site Contamination) Measure*, 1999 as amended 2013.

| Sample Identification | PQL | Guideline[A] | | Sed-1 | Sed-1 | Sed-1 | Sed-1 | Sed-2 | Sed-2 | Sed-2 | Sed-2 | Sed-3 | Sed-3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | | DGV | GV-High | 19/7/23 | 26/5/21 | 22/6/22 | 19/7/23 | 19/8/20 | 26/5/21 | 22/6/22 | 19/7/23 | 19/8/20 | 26/5/21 |
| Sample Profile | | | | Sediment | Sediment | Sediment | Sediment | Sediment | Sediment | Sediment | Sediment | Sediment | Sediment |
| Sample Purpose | | | | Monitoring | Monitoring | Monitoring | Monitoring | Monitoring | Monitoring | Monitoring | Monitoring | Monitoring | Monitoring |
| Sample collected by | | | | RCA-SK | RCA-SK | RCA-SK | RCA-SK | RCA-SK | RCA-SK | RCA-SK | RCA-SK | RCA-SK | RCA-SK |
| **Metals** | | | | | | | | | | | | | |
| Aluminium | 50 | | | 3560 | 7460 | 11800 | 12400 | 3980 | 7560 | 8810 | 8800 | 4380 | 9990 |
| Antimony | 5 | 2 | 25 | <5 | <5 | <5 | <0.50 | <5 | <5 | <5 | <0.50 | <5 | <5 |
| Arsenic | 5 | 20 | 70 | 10 | 9 | 6 | 9.35 | 11 | 12 | 11 | 12.8 | 8 | 12 |
| Cadmium | 1 | 1.5 | 10 | <1 | 1 | 1 | 1.3 | <1 | <1 | <1 | 0.5 | <1 | <1 |
| Chromium | 2 | 80 | 370 | 9 | 11 | 14 | 19.3 | 5 | 10 | 10 | 12.4 | 5 | 13 |
| Cobalt | 2 | | | 3 | 4 | 4 | 6.2 | 4 | 6 | 5 | 6.5 | 3 | 6 |
| Copper | 5 | 65 | 270 | 33 | 44 | **83** | **68.7** | 19 | 35 | 30 | 42.7 | 16 | 39 |
| Iron | 50 | | | 7090 | 14600 | 15300 | 18800 | 8630 | 15400 | 12200 | 14500 | 8140 | 18500 |
| Lead | 5 | 50 | 220 | 12 | 13 | 14 | 20.7 | 7 | 14 | 10 | 13.2 | 7 | 16 |
| Manganese | 5 | | | 58 | 163 | 158 | 217 | 121 | 192 | 151 | 187 | 116 | 247 |
| Nickel | 2 | 21 | 52 | 4 | 6 | 7 | 8.8 | 3 | 6 | 4 | 5.6 | 2 | 7 |
| Selenium | 5 | | | <5 | <5 | <5 | 2.6 | <5 | <5 | <5 | 1.2 | <5 | <5 |
| Silver | 2 | 1 | 4 | <2 | <2 | <2 | <0.1 | <2 | <2 | <2 | <0.1 | <2 | <2 |
| Vanadium | 5 | | | 11 | 26 | 31 | 36 | 11 | 24 | 19 | 21 | 12 | 30 |
| Zinc | 5 | 200 | 410 | 78 | 97 | 132 | 153 | 53 | 94 | 78 | 90.6 | 52 | 102 |
| Mercury | 0.1 | 0.15 | 1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| **Organometallics** | | | | | | | | | | | | | |
| Tributyltin | 0.5 | 9 | 70 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| **Organics** | | | | | | | | | | | | | |
| Total Organic Carbon | 0.02 | | | 1.61 | 2 | 4.46 | 4.64 | 2 | 1.63 | 1.96 | 1.6 | 1.69 | 1.99 |

All results are in units of mg/kg except Total Organic Carbon which is in %.

Blank Cell indicates no criterion available

PQL = Practical Quantitation Limit. Where PQL is for a summation, PQL of all components is summed and may be different from that presented by laboratory

[A] ANZG Toxicant default guideline values for sediment quality, Table 1

DGV = Detault Guideline Value

GV-High = Upper Guideline Value

Results shown in **BOLD** are in excess of the DGV

Results shown in shading are in excess of the GV-High

| Sample Identification | PQL | Guideline[A] | | Sed-3 | Sed-3 | Sed-4 | Sed-4 | Sed-4 | Point A | Point A | Point A | Point A | Point A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | | DGV | GV-High | 22/6/22 | 19/7/23 | 26/5/21 | 22/6/22 | 19/7/23 | 17/4/19 | 19/8/20 | 26/5/21 | 22/6/22 | 19/7/23 |
| Sample Profile | | | | Sediment | Sediment | Sediment | Sediment | Sediment | Sediment | Sediment | Sediment | Sediment | Sediment |
| Sample Purpose | | | | Monitoring | Monitoring | Monitoring | Monitoring | Monitoring | Monitoring | Monitoring | Monitoring | Monitoring | Monitoring |
| Sample collected by | | | | RCA-SK | RCA-SK | RCA-SK | RCA-SK | RCA-SK | Enviropacific | RCA-SK | RCA-SK | RCA-SK | RCA-SK |
| **Metals** | | | | | | | | | | | | | |
| Aluminium | 50 | | | 11700 | 5800 | 5340 | 6310 | 16400 | 11200 | 2870 | 4260 | 5620 | 8740 |
| Antimony | 5 | 2 | 25 | <5 | <0.5 | <5 | <5 | <0.50 | <0.5 | <5 | <5 | <5 | <0.50 |
| Arsenic | 5 | 20 | 70 | 8 | 8.3 | 7 | 5 | 15.2 | 17.7 | 7 | 10 | 13 | 17.2 |
| Cadmium | 1 | 1.5 | 10 | <1 | 0.5 | <1 | <1 | 1.1 | 0.8 | <1 | <1 | <1 | 0.5 |
| Chromium | 2 | 80 | 370 | 13 | 8.5 | 7 | 7 | 23.1 | 16.5 | 4 | 6 | 7 | 13.6 |
| Cobalt | 2 | | | 5 | 4.6 | 4 | 3 | 9.5 | 6.9 | 2 | 3 | 4 | 6 |
| Copper | 5 | 65 | 270 | 48 | 26.1 | 26 | 28 | 67.1 | 52.4 | 11 | 20 | 15 | 36.6 |
| Iron | 50 | | | 15800 | 9040 | 10200 | 8300 | 26600 | 25000 | 6800 | 9320 | 11800 | 19100 |
| Lead | 5 | 50 | 220 | 14 | 9.2 | 8 | 8 | 27.2 | 22.3 | 6 | 8 | 8 | 14.6 |
| Manganese | 5 | | | 218 | 142 | 154 | 130 | 365 | 323 | 58 | 85 | 85 | 427 |
| Nickel | 2 | 21 | 52 | 6 | 4.3 | 4 | 3 | 10.2 | 7.3 | <2 | 4 | 3 | 7.3 |
| Selenium | 5 | | | <5 | 1.1 | <5 | <5 | 2.3 | 2 | <5 | <5 | <5 | 1.5 |
| Silver | 2 | 1 | 4 | <2 | <0.1 | <2 | <2 | <0.1 | 0.1 | <2 | <2 | <2 | <0.1 |
| Vanadium | 5 | | | 26 | 15 | 18 | 15 | 40 | 35.6 | 12 | 14 | 17 | 34 |
| Zinc | 5 | 200 | 410 | 112 | 63.8 | 64 | 57 | 175 | 128 | 35 | 50 | 46 | 87.8 |
| Mercury | 0.1 | 0.15 | 1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.07 | <0.1 | <0.1 | <0.1 | 0.06 |
| **Organometallics** | | | | | | | | | | | | | |
| Tributyltin | 0.5 | 9 | 70 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| **Organics** | | | | | | | | | | | | | |
| Total Organic Carbon | 0.02 | | | 2.5 | 1.55 | 1.35 | 1.0 | 2.18 | 2.46 | 0.88 | 1.28 | 0.76 | 0.369 |

All results are in units of mg/kg except Total Organic Carbon which is in %.

Blank Cell indicates no criterion available

PQL = Practical Quantitation Limit. Where PQL is for a summation, PQL of all components is

[A] ANZG Toxicant default guideline values for sediment quality, Table 1

DGV = Detault Guideline Value

GV-High = Upper Guideline Value

Results shown in **BOLD** are in excess of the DGV

Results shown in shading are in excess of the GV-High

| Sample Identification | PQL | Guideline[A] | | Point C | Point C | Point C | Point C | Point C |
|---|---|---|---|---|---|---|---|---|
| Date | | DGV | GV-High | 17/4/19 | 19/8/20 | 26/5/21 | 22/6/22 | 17/7/23 |
| Sample Profile | | | | Sediment | Sediment | Sediment | Sediment | Sediment |
| Sample Purpose | | | | Monitoring | Monitoring | Monitoring | Monitoring | Monitoring |
| Sample collected by | | | | Enviropacific | RCA-SK | RCA-SK | RCA-SK | RCA-SK |
| **Metals** | | | | | | | | |
| Aluminium | 50 | | | 7530 | 1940 | 15700 | 7860 | 12000 |
| Antimony | 5 | 2 | 25 | <0.5 | <5 | <5 | <5 | <0.5 |
| Arsenic | 5 | 20 | 70 | 11.2 | <5 | 19 | 8 | 9.87 |
| Cadmium | 1 | 1.5 | 10 | 0.7 | <1 | <1 | <1 | 0.7 |
| Chromium | 2 | 80 | 370 | 12.6 | 2 | 19 | 9 | 16.3 |
| Cobalt | 2 | | | 5.5 | <2 | 8 | 4 | 6.3 |
| Copper | 5 | 65 | 270 | 41.6 | 10 | 44 | 26 | 50.2 |
| Iron | 50 | | | 18400 | 3280 | 28500 | 9860 | 17100 |
| Lead | 5 | 50 | 220 | 19.2 | <5 | 20 | 10 | 16.9 |
| Manganese | 5 | | | 243 | 43 | 408 | 106 | 267 |
| Nickel | 2 | 21 | 52 | 5.8 | <2 | 10 | 4 | 7.3 |
| Selenium | 5 | | | 1.9 | <5 | <5 | <5 | 1.5 |
| Silver | 2 | 1 | 4 | <0.1 | <2 | <2 | <2 | <0.1 |
| Vanadium | 5 | | | 28.9 | 5 | 48 | 19 | 27 |
| Zinc | 5 | 200 | 410 | 93 | 25 | 152 | 64 | 120 |
| Mercury | 0.1 | 0.15 | 1 | 0.06 | <0.1 | <0.1 | <0.1 | <0.1 |
| **Organometallics** | | | | | | | | |
| Tributyltin | 0.5 | 9 | 70 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| **Organics** | | | | | | | | |
| Total Organic Carbon | 0.02 | | | 1.56 | 0.96 | 1.92 | 0.98 | 2.07 |

All results are in units of mg/kg except Total Organic Carbon which is in %.

Blank Cell indicates no criterion available

PQL = Practical Quantitation Limit. Where PQL is for a summation, PQL of all components is

[A] ANZG Toxicant default guideline values for sediment quality, Table 1

DGV = Detault Guideline Value

GV-High = Upper Guideline Value

Results shown in **BOLD** are in excess of the DGV

Results shown in shading are in excess of the GV-High

# CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| **Work Order** | : **ES2324044** | Page | : 1 of 6 |
| Client | : **ROBERT CARR & ASSOCIATES P/L** | Laboratory | : Environmental Division Sydney |
| Contact | : MS LAURA SCHOFIELD | Contact | : Customer Services ES |
| Address | : 92 HILL STREET<br>CARRINGTON NSW 2294 | Address | : 277-289 Woodpark Road Smithfield NSW Australia 2164 |
| Telephone | : +61 02 49029200 | Telephone | : +61-2-8784 8555 |
| Project | : 14302 | Date Samples Received | : 19-Jul-2023 13:21 |
| Order number | : ---- | Date Analysis Commenced | : 21-Jul-2023 |
| C-O-C number | : ---- | Issue Date | : 02-Aug-2023 13:56 |
| Sampler | : ---- | | |
| Site | : Trinity point | | |
| Quote number | : SYBQ/400/21 | | |
| No. of samples received | : 8 | | |
| No. of samples analysed | : 8 | | |

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* |
|---|---|---|
| Ankit Joshi | Senior Chemist - Inorganics | Sydney Inorganics, Smithfield, NSW |
| Edwandy Fadjar | Organic Coordinator | Sydney Organics, Smithfield, NSW |
| Evie Sidarta | Inorganic Chemist | Sydney Inorganics, Smithfield, NSW |
| Kim McCabe | Senior Inorganic Chemist | Brisbane Acid Sulphate Soils, Stafford, QLD |
| Kirsty Watson | Senior Chemist - Organics | Brisbane Organics, Stafford, QLD |
| Matt Frost | Assistant Laboratory Manager | Brisbane Organics, Stafford, QLD |

## General Comments

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

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

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

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

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

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

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

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

## Analytical Results

| Sub-Matrix: SEDIMENT (Matrix: SOIL) | | | | Sample ID | 072314302003 Sed 1 | 072304302004 Sed 2 | 072304302005 Sed 3 | 072304302006 Sed 4 | 072304302007 Point A |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Sampling date / time | 19-Jul-2023 00:00 | 19-Jul-2023 00:00 | 19-Jul-2023 00:00 | 19-Jul-2023 00:00 | 19-Jul-2023 00:00 |
| Compound | CAS Number | LOR | Unit | | ES2324044-001 | ES2324044-002 | ES2324044-003 | ES2324044-004 | ES2324044-005 |
| | | | | | Result | Result | Result | Result | Result |
| **EA055: Moisture Content (Dried @ 105-110°C)** | | | | | | | | | |
| Moisture Content | ---- | 0.1 | % | | 75.6 | 58.3 | 44.1 | 65.9 | 39.0 |
| **EG005(ED093)-SD: Total Metals in Sediments by ICP-AES** | | | | | | | | | |
| Aluminium | 7429-90-5 | 50 | mg/kg | | 12400 | 8800 | 5800 | 16400 | 8740 |
| Iron | 7439-89-6 | 50 | mg/kg | | 18800 | 14500 | 9040 | 26600 | 19100 |
| Vanadium | 7440-62-2 | 2 | mg/kg | | 36 | 21 | 15 | 40 | 34 |
| **EG020-SD: Total Metals in Sediments by ICPMS** | | | | | | | | | |
| Antimony | 7440-36-0 | 0.50 | mg/kg | | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 |
| Arsenic | 7440-38-2 | 1.00 | mg/kg | | 9.35 | 12.8 | 8.30 | 15.2 | 17.2 |
| Cadmium | 7440-43-9 | 0.1 | mg/kg | | 1.3 | 0.5 | 0.5 | 1.1 | 0.5 |
| Chromium | 7440-47-3 | 1.0 | mg/kg | | 19.3 | 12.4 | 8.5 | 23.1 | 13.6 |
| Copper | 7440-50-8 | 1.0 | mg/kg | | 68.7 | 42.7 | 26.1 | 67.1 | 36.6 |
| Cobalt | 7440-48-4 | 0.5 | mg/kg | | 6.2 | 6.5 | 4.6 | 9.5 | 6.0 |
| Lead | 7439-92-1 | 1.0 | mg/kg | | 20.7 | 13.2 | 9.2 | 27.2 | 14.6 |
| Manganese | 7439-96-5 | 10 | mg/kg | | 217 | 187 | 142 | 365 | 427 |
| Nickel | 7440-02-0 | 1.0 | mg/kg | | 8.8 | 5.6 | 4.3 | 10.2 | 7.3 |
| Selenium | 7782-49-2 | 0.1 | mg/kg | | 2.6 | 1.2 | 1.1 | 2.3 | 1.5 |
| Silver | 7440-22-4 | 0.1 | mg/kg | | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Zinc | 7440-66-6 | 1.0 | mg/kg | | 153 | 90.6 | 63.8 | 175 | 87.8 |
| **EP003: Total Organic Carbon (TOC) in Soil** | | | | | | | | | |
| Total Organic Carbon | ---- | 0.02 | % | | 4.64 | 1.60 | 1.55 | 2.18 | 0.69 |
| **EP090: Organotin Compounds** | | | | | | | | | |
| Tributyltin | 56573-85-4 | 0.5 | µgSn/kg | | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| **EP090S: Organotin Surrogate** | | | | | | | | | |
| Tripropyltin | ---- | 0.5 | % | | 64.0 | 66.2 | 57.6 | 54.3 | 72.1 |

## Analytical Results

| Sub-Matrix: SEDIMENT (Matrix: SOIL) | | | | Sample ID | 072304302008 Point C | ---- | ---- | ---- | ---- |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Sampling date / time | 19-Jul-2023 00:00 | ---- | ---- | ---- | ---- |
| Compound | CAS Number | LOR | Unit | | ES2324044-006 | -------- | -------- | -------- | -------- |
| | | | | | Result | ---- | ---- | ---- | ---- |
| **EA055: Moisture Content (Dried @ 105-110°C)** | | | | | | | | | |
| Moisture Content | ---- | 0.1 | % | | **66.2** | ---- | ---- | ---- | ---- |
| **EG005(ED093)-SD: Total Metals in Sediments by ICP-AES** | | | | | | | | | |
| Aluminium | 7429-90-5 | 50 | mg/kg | | **12000** | ---- | ---- | ---- | ---- |
| Iron | 7439-89-6 | 50 | mg/kg | | **17100** | ---- | ---- | ---- | ---- |
| Vanadium | 7440-62-2 | 2 | mg/kg | | **27** | ---- | ---- | ---- | ---- |
| **EG020-SD: Total Metals in Sediments by ICPMS** | | | | | | | | | |
| Antimony | 7440-36-0 | 0.50 | mg/kg | | <0.50 | ---- | ---- | ---- | ---- |
| Arsenic | 7440-38-2 | 1.00 | mg/kg | | **9.87** | ---- | ---- | ---- | ---- |
| Cadmium | 7440-43-9 | 0.1 | mg/kg | | **0.7** | ---- | ---- | ---- | ---- |
| Chromium | 7440-47-3 | 1.0 | mg/kg | | **16.3** | ---- | ---- | ---- | ---- |
| Copper | 7440-50-8 | 1.0 | mg/kg | | **50.2** | ---- | ---- | ---- | ---- |
| Cobalt | 7440-48-4 | 0.5 | mg/kg | | **6.3** | ---- | ---- | ---- | ---- |
| Lead | 7439-92-1 | 1.0 | mg/kg | | **16.9** | ---- | ---- | ---- | ---- |
| Manganese | 7439-96-5 | 10 | mg/kg | | **267** | ---- | ---- | ---- | ---- |
| Nickel | 7440-02-0 | 1.0 | mg/kg | | **7.3** | ---- | ---- | ---- | ---- |
| Selenium | 7782-49-2 | 0.1 | mg/kg | | **1.5** | ---- | ---- | ---- | ---- |
| Silver | 7440-22-4 | 0.1 | mg/kg | | <0.1 | ---- | ---- | ---- | ---- |
| Zinc | 7440-66-6 | 1.0 | mg/kg | | **120** | ---- | ---- | ---- | ---- |
| **EP003: Total Organic Carbon (TOC) in Soil** | | | | | | | | | |
| Total Organic Carbon | ---- | 0.02 | % | | **2.07** | ---- | ---- | ---- | ---- |
| **EP090: Organotin Compounds** | | | | | | | | | |
| Tributyltin | 56573-85-4 | 0.5 | µgSn/kg | | <0.5 | ---- | ---- | ---- | ---- |
| **EP090S: Organotin Surrogate** | | | | | | | | | |
| Tripropyltin | ---- | 0.5 | % | | **60.9** | ---- | ---- | ---- | ---- |

## Analytical Results

| Sub-Matrix: WATER (Matrix: WATER) | | | | Sample ID | 072304302009 MW5 | 072304302010 MW6 | ---- | ---- | ---- |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Sampling date / time | 19-Jul-2023 00:00 | 19-Jul-2023 00:00 | ---- | ---- | ---- |
| Compound | CAS Number | LOR | Unit | | ES2324044-007 | ES2324044-008 | -------- | -------- | -------- |
| | | | | | Result | Result | ---- | ---- | ---- |
| **EP080/071: Total Petroleum Hydrocarbons** | | | | | | | | | |
| C6 - C9 Fraction | ---- | 20 | µg/L | | <20 | <20 | ---- | ---- | ---- |
| C10 - C14 Fraction | ---- | 50 | µg/L | | <50 | <50 | ---- | ---- | ---- |
| C15 - C28 Fraction | ---- | 100 | µg/L | | <100 | <100 | ---- | ---- | ---- |
| C29 - C36 Fraction | ---- | 50 | µg/L | | <50 | <50 | ---- | ---- | ---- |
| ^ C10 - C36 Fraction (sum) | ---- | 50 | µg/L | | <50 | <50 | ---- | ---- | ---- |
| **EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions** | | | | | | | | | |
| C6 - C10 Fraction | C6_C10 | 20 | µg/L | | <20 | <20 | ---- | ---- | ---- |
| ^ C6 - C10 Fraction minus BTEX (F1) | C6_C10-BTEX | 20 | µg/L | | <20 | <20 | ---- | ---- | ---- |
| >C10 - C16 Fraction | ---- | 100 | µg/L | | <100 | <100 | ---- | ---- | ---- |
| >C16 - C34 Fraction | ---- | 100 | µg/L | | <100 | <100 | ---- | ---- | ---- |
| >C34 - C40 Fraction | ---- | 100 | µg/L | | <100 | <100 | ---- | ---- | ---- |
| ^ >C10 - C40 Fraction (sum) | ---- | 100 | µg/L | | <100 | <100 | ---- | ---- | ---- |
| ^ >C10 - C16 Fraction minus Naphthalene (F2) | ---- | 100 | µg/L | | <100 | <100 | ---- | ---- | ---- |
| **EP080: BTEXN** | | | | | | | | | |
| Benzene | 71-43-2 | 1 | µg/L | | <1 | <1 | ---- | ---- | ---- |
| Toluene | 108-88-3 | 2 | µg/L | | <2 | <2 | ---- | ---- | ---- |
| Ethylbenzene | 100-41-4 | 2 | µg/L | | <2 | <2 | ---- | ---- | ---- |
| meta- & para-Xylene | 108-38-3 106-42-3 | 2 | µg/L | | <2 | <2 | ---- | ---- | ---- |
| ortho-Xylene | 95-47-6 | 2 | µg/L | | <2 | <2 | ---- | ---- | ---- |
| ^ Total Xylenes | ---- | 2 | µg/L | | <2 | <2 | ---- | ---- | ---- |
| ^ Sum of BTEX | ---- | 1 | µg/L | | <1 | <1 | ---- | ---- | ---- |
| Naphthalene | 91-20-3 | 5 | µg/L | | <5 | <5 | ---- | ---- | ---- |
| **EP080S: TPH(V)/BTEX Surrogates** | | | | | | | | | |
| 1.2-Dichloroethane-D4 | 17060-07-0 | 2 | % | | **87.1** | **98.3** | ---- | ---- | ---- |
| Toluene-D8 | 2037-26-5 | 2 | % | | **108** | **120** | ---- | ---- | ---- |
| 4-Bromofluorobenzene | 460-00-4 | 2 | % | | **111** | **124** | ---- | ---- | ---- |

## Surrogate Control Limits

| Sub-Matrix: **SEDIMENT** | | Recovery Limits (%) | |
|---|---|---|---|
| *Compound* | *CAS Number* | *Low* | *High* |
| **EP090S: Organotin Surrogate** | | | |
| **Tripropyltin** | ---- | 35 | 130 |

| Sub-Matrix: **WATER** | | Recovery Limits (%) | |
|---|---|---|---|
| *Compound* | *CAS Number* | *Low* | *High* |
| **EP080S: TPH(V)/BTEX Surrogates** | | | |
| **1.2-Dichloroethane-D4** | 17060-07-0 | 72 | 143 |
| **Toluene-D8** | 2037-26-5 | 75 | 131 |
| **4-Bromofluorobenzene** | 460-00-4 | 73 | 137 |

## Inter-Laboratory Testing

Analysis conducted by ALS Brisbane, NATA accreditation no. 825, site no. 818 (Chemistry) 18958 (Biology).

(SOIL) EP003: Total Organic Carbon (TOC) in Soil

(SOIL) EP090: Organotin Compounds

(SOIL) EP090S: Organotin Surrogate

# QUALITY CONTROL REPORT

| | | | |
|---|---|---|---|
| **Work Order** | : **ES2324044** | Page | : 1 of 6 |
| Client | : **ROBERT CARR & ASSOCIATES P/L** | Laboratory | : Environmental Division Sydney |
| Contact | : MS LAURA SCHOFIELD | Contact | : Customer Services ES |
| Address | : 92 HILL STREET<br>CARRINGTON NSW 2294 | Address | : 277-289 Woodpark Road Smithfield NSW Australia 2164 |
| Telephone | : +61 02 49029200 | Telephone | : +61-2-8784 8555 |
| Project | : 14302 | Date Samples Received | : 19-Jul-2023 |
| Order number | : ---- | Date Analysis Commenced | : 21-Jul-2023 |
| C-O-C number | : ---- | Issue Date | : 02-Aug-2023 |
| Sampler | : ---- | | |
| Site | : Trinity point | | |
| Quote number | : SYBQ/400/21 | | |
| No. of samples received | : 8 | | |
| No. of samples analysed | : 8 | | |

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

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

This Quality Control Report contains the following information:

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

## *Signatories*

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

| *Signatories* | *Position* | *Accreditation Category* |
|---|---|---|
| Ankit Joshi | Senior Chemist - Inorganics | Sydney Inorganics, Smithfield, NSW |
| Edwandy Fadjar | Organic Coordinator | Sydney Organics, Smithfield, NSW |
| Evie Sidarta | Inorganic Chemist | Sydney Inorganics, Smithfield, NSW |
| Kim McCabe | Senior Inorganic Chemist | Brisbane Acid Sulphate Soils, Stafford, QLD |
| Kirsty Watson | Senior Chemist - Organics | Brisbane Organics, Stafford, QLD |
| Matt Frost | Assistant Laboratory Manager | Brisbane Organics, Stafford, QLD |

## General Comments

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

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

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

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

## Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

| | | | | Laboratory Duplicate (DUP) Report | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| *Laboratory sample ID* | *Sample ID* | *Method: Compound* | *CAS Number* | *LOR* | *Unit* | *Original Result* | *Duplicate Result* | *RPD (%)* | *Acceptable RPD (%)* |
| **EG005(ED093)-SD: Total Metals in Sediments by ICP-AES (QC Lot: 5186485)** | | | | | | | | | |
| ES2324044-001 | 072314302003 Sed 1 | EG005-SD: Aluminium | 7429-90-5 | 50 | mg/kg | 12400 | 11600 | 6.4 | 0% - 20% |
| | | EG005-SD: Iron | 7439-89-6 | 50 | mg/kg | 18800 | 17900 | 4.8 | 0% - 20% |
| **EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 5186499)** | | | | | | | | | |
| ES2323581-069 | Anonymous | EA055: Moisture Content | ---- | 0.1 | % | 18.8 | 17.8 | 5.7 | 0% - 20% |
| **EG020-SD: Total Metals in Sediments by ICPMS (QC Lot: 5186486)** | | | | | | | | | |
| ES2324044-001 | 072314302003 Sed 1 | EG020-SD: Cadmium | 7440-43-9 | 0.1 | mg/kg | 1.3 | 1.2 | 13.4 | 0% - 50% |
| | | EG020-SD: Selenium | 7782-49-2 | 0.1 | mg/kg | 2.6 | 2.5 | 4.5 | 0% - 20% |
| | | EG020-SD: Silver | 7440-22-4 | 0.1 | mg/kg | <0.1 | <0.1 | 0.0 | No Limit |
| | | EG020-SD: Antimony | 7440-36-0 | 0.5 | mg/kg | <0.50 | <0.50 | 0.0 | No Limit |
| | | EG020-SD: Cobalt | 7440-48-4 | 0.5 | mg/kg | 6.2 | 5.7 | 8.5 | 0% - 50% |
| | | EG020-SD: Arsenic | 7440-38-2 | 1 | mg/kg | 9.35 | 9.20 | 1.6 | No Limit |
| | | EG020-SD: Chromium | 7440-47-3 | 1 | mg/kg | 19.3 | 17.6 | 9.5 | 0% - 50% |
| | | EG020-SD: Copper | 7440-50-8 | 1 | mg/kg | 68.7 | 64.0 | 7.1 | 0% - 20% |
| | | EG020-SD: Lead | 7439-92-1 | 1 | mg/kg | 20.7 | 19.4 | 6.0 | 0% - 20% |
| | | EG020-SD: Nickel | 7440-02-0 | 1 | mg/kg | 8.8 | 8.0 | 9.9 | No Limit |
| | | EG020-SD: Zinc | 7440-66-6 | 1 | mg/kg | 153 | 141 | 8.3 | 0% - 20% |
| | | EG020-SD: Manganese | 7439-96-5 | 10 | mg/kg | 217 | 193 | 11.6 | 0% - 20% |
| **EP003: Total Organic Carbon (TOC) in Soil (QC Lot: 5205938)** | | | | | | | | | |
| ES2324044-001 | 072314302003 Sed 1 | EP003: Total Organic Carbon | ---- | 0.02 | % | 4.64 | 4.58 | 1.2 | 0% - 20% |
| **EP090: Organotin Compounds (QC Lot: 5190661)** | | | | | | | | | |
| EB2321601-010 | Anonymous | EP090: Tributyltin | 56573-85-4 | 0.5 | µgSn/kg | <0.5 | <0.5 | 0.0 | No Limit |
| ES2324044-006 | 072304302008 Point C | EP090: Tributyltin | 56573-85-4 | 0.5 | µgSn/kg | <0.5 | <0.5 | 0.0 | No Limit |

Sub-Matrix: **WATER**

| | | | | Laboratory Duplicate (DUP) Report | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| *Laboratory sample ID* | *Sample ID* | *Method: Compound* | *CAS Number* | *LOR* | *Unit* | *Original Result* | *Duplicate Result* | *RPD (%)* | *Acceptable RPD (%)* |
| **EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5183488)** | | | | | | | | | |
| ES2323929-001 | Anonymous | EP080: C6 - C9 Fraction | ---- | 20 | µg/L | <20 | <20 | 0.0 | No Limit |
| WN2308847-001 | Anonymous | EP080: C6 - C9 Fraction | ---- | 20 | µg/L | <20 | <20 | 0.0 | No Limit |
| **EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5183488)** | | | | | | | | | |
| ES2323929-001 | Anonymous | EP080: C6 - C10 Fraction | C6_C10 | 20 | µg/L | <20 | <20 | 0.0 | No Limit |
| WN2308847-001 | Anonymous | EP080: C6 - C10 Fraction | C6_C10 | 20 | µg/L | <20 | <20 | 0.0 | No Limit |
| **EP080: BTEXN (QC Lot: 5183488)** | | | | | | | | | |
| ES2323929-001 | Anonymous | EP080: Benzene | 71-43-2 | 1 | µg/L | <1 | <1 | 0.0 | No Limit |
| | | EP080: Toluene | 108-88-3 | 2 | µg/L | <2 | <2 | 0.0 | No Limit |
| | | EP080: Ethylbenzene | 100-41-4 | 2 | µg/L | <2 | <2 | 0.0 | No Limit |
| | | EP080: meta- & para-Xylene | 108-38-3<br>106-42-3 | 2 | µg/L | <2 | <2 | 0.0 | No Limit |
| | | EP080: ortho-Xylene | 95-47-6 | 2 | µg/L | <2 | <2 | 0.0 | No Limit |
| | | EP080: Naphthalene | 91-20-3 | 5 | µg/L | <5 | <5 | 0.0 | No Limit |
| WN2308847-001 | Anonymous | EP080: Benzene | 71-43-2 | 1 | µg/L | <1 | <1 | 0.0 | No Limit |
| | | EP080: Toluene | 108-88-3 | 2 | µg/L | <2 | <2 | 0.0 | No Limit |
| | | EP080: Ethylbenzene | 100-41-4 | 2 | µg/L | <2 | <2 | 0.0 | No Limit |
| | | EP080: meta- & para-Xylene | 108-38-3<br>106-42-3 | 2 | µg/L | <2 | <2 | 0.0 | No Limit |
| | | EP080: ortho-Xylene | 95-47-6 | 2 | µg/L | <2 | <2 | 0.0 | No Limit |
| | | EP080: Naphthalene | 91-20-3 | 5 | µg/L | <5 | <5 | 0.0 | No Limit |

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

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

Sub-Matrix: **SOIL**

| | | | | Method Blank (MB) Report | Laboratory Control Spike (LCS) Report | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Spike | Spike Recovery (%) | Acceptable Limits (%) | |
| Method: Compound | CAS Number | LOR | Unit | Result | Concentration | LCS | Low | High |
| **EG005(ED093)-SD: Total Metals in Sediments by ICP-AES (QCLot: 5186485)** | | | | | | | | |
| EG005-SD: Aluminium | 7429-90-5 | 50 | mg/kg | <50 | 15910 mg/kg | 106 | 88.2 | 136 |
| EG005-SD: Iron | 7439-89-6 | 50 | mg/kg | <50 | 31660 mg/kg | 99.6 | 70.0 | 109 |
| EG005-SD: Vanadium | 7440-62-2 | ---- | mg/kg | ---- | 61.3 mg/kg | 107 | 95.7 | 120 |
| **EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 5186486)** | | | | | | | | |
| EG020-SD: Antimony | 7440-36-0 | 0.5 | mg/kg | <0.50 | 1.54 mg/kg | 121 | 70.0 | 130 |
| EG020-SD: Arsenic | 7440-38-2 | 1 | mg/kg | <1.00 | 110 mg/kg | 110 | 80.0 | 139 |
| EG020-SD: Cadmium | 7440-43-9 | 0.1 | mg/kg | <0.1 | 0.8 mg/kg | 110 | 83.0 | 127 |
| EG020-SD: Chromium | 7440-47-3 | 1 | mg/kg | <1.0 | 20.3 mg/kg | 116 | 73.0 | 130 |
| EG020-SD: Copper | 7440-50-8 | 1 | mg/kg | <1.0 | 49 mg/kg | 106 | 76.0 | 130 |
| EG020-SD: Cobalt | 7440-48-4 | 0.5 | mg/kg | <0.5 | 10.7 mg/kg | 106 | 81.0 | 130 |
| EG020-SD: Lead | 7439-92-1 | 1 | mg/kg | <1.0 | 57.4 mg/kg | 109 | 74.0 | 130 |
| EG020-SD: Manganese | 7439-96-5 | 10 | mg/kg | <10 | 536 mg/kg | 110 | 76.0 | 130 |
| EG020-SD: Nickel | 7440-02-0 | 1 | mg/kg | <1.0 | 14.7 mg/kg | 107 | 83.0 | 130 |
| EG020-SD: Selenium | 7782-49-2 | 0.1 | mg/kg | <0.1 | ---- | ---- | ---- | ---- |
| EG020-SD: Silver | 7440-22-4 | 0.1 | mg/kg | <0.1 | 2.75 mg/kg | 88.8 | 64.0 | 148 |
| EG020-SD: Zinc | 7440-66-6 | 1 | mg/kg | <1.0 | 125.8 mg/kg | 108 | 82.0 | 137 |
| **EP003: Total Organic Carbon (TOC) in Soil (QCLot: 5205938)** | | | | | | | | |
| EP003: Total Organic Carbon | ---- | 0.02 | % | <0.02 | 0.55 % | 96.7 | 80.0 | 120 |
| | | | | <0.02 | 32.3 % | 98.1 | 80.0 | 120 |
| **EP090: Organotin Compounds (QCLot: 5190661)** | | | | | | | | |
| EP090: Tributyltin | 56573-85-4 | 0.5 | µgSn/kg | <0.5 | 1.25 µgSn/kg | 104 | 52.0 | 139 |

Sub-Matrix: **WATER**

| | | | | Method Blank (MB) Report | Laboratory Control Spike (LCS) Report | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Spike | Spike Recovery (%) | Acceptable Limits (%) | |
| Method: Compound | CAS Number | LOR | Unit | Result | Concentration | LCS | Low | High |
| **EP080/071: Total Petroleum Hydrocarbons (QCLot: 5183427)** | | | | | | | | |
| EP071: C10 - C14 Fraction | ---- | 50 | µg/L | <50 | 400 µg/L | 69.0 | 53.7 | 97.0 |
| EP071: C15 - C28 Fraction | ---- | 100 | µg/L | <100 | 600 µg/L | 80.0 | 63.3 | 107 |
| EP071: C29 - C36 Fraction | ---- | 50 | µg/L | <50 | 400 µg/L | 98.9 | 58.3 | 120 |
| **EP080/071: Total Petroleum Hydrocarbons (QCLot: 5183488)** | | | | | | | | |
| EP080: C6 - C9 Fraction | ---- | 20 | µg/L | <20 | 260 µg/L | 80.4 | 75.0 | 127 |

Sub-Matrix: **WATER**

| Method: Compound | CAS Number | LOR | Unit | Method Blank (MB) Report: Result | Laboratory Control Spike (LCS) Report: Spike Concentration | LCS: Spike Recovery (%) | Acceptable Limits (%): Low | Acceptable Limits (%): High |
|---|---|---|---|---|---|---|---|---|
| **EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5183427)** | | | | | | | | |
| EP071: >C10 - C16 Fraction | ---- | 100 | µg/L | <100 | 500 µg/L | 77.9 | 53.9 | 95.5 |
| EP071: >C16 - C34 Fraction | ---- | 100 | µg/L | <100 | 700 µg/L | 96.7 | 57.8 | 110 |
| EP071: >C34 - C40 Fraction | ---- | 100 | µg/L | <100 | 300 µg/L | 73.8 | 50.5 | 115 |
| **EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5183488)** | | | | | | | | |
| EP080: C6 - C10 Fraction | C6_C10 | 20 | µg/L | <20 | 310 µg/L | 85.4 | 75.0 | 127 |
| **EP080: BTEXN (QCLot: 5183488)** | | | | | | | | |
| EP080: Benzene | 71-43-2 | 1 | µg/L | <1 | 10 µg/L | 89.8 | 68.3 | 119 |
| EP080: Toluene | 108-88-3 | 2 | µg/L | <2 | 10 µg/L | 95.9 | 73.5 | 120 |
| EP080: Ethylbenzene | 100-41-4 | 2 | µg/L | <2 | 10 µg/L | 97.3 | 73.8 | 122 |
| EP080: meta- & para-Xylene | 108-38-3<br>106-42-3 | 2 | µg/L | <2 | 10 µg/L | 92.9 | 73.0 | 122 |
| EP080: ortho-Xylene | 95-47-6 | 2 | µg/L | <2 | 10 µg/L | 100 | 76.4 | 123 |
| EP080: Naphthalene | 91-20-3 | 5 | µg/L | <5 | 10 µg/L | 105 | 75.5 | 124 |

## Matrix Spike (MS) Report

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

Sub-Matrix: **SOIL**

| Laboratory sample ID | Sample ID | Method: Compound | CAS Number | Matrix Spike (MS) Report: Spike Concentration | SpikeRecovery(%): MS | Acceptable Limits (%): Low | Acceptable Limits (%): High |
|---|---|---|---|---|---|---|---|
| **EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 5186486)** | | | | | | | |
| ES2324044-002 | 072304302004 Sed 2 | EG020-SD: Arsenic | 7440-38-2 | 50 mg/kg | 105 | 70.0 | 130 |
| | | EG020-SD: Cadmium | 7440-43-9 | 50 mg/kg | 104 | 70.0 | 130 |
| | | EG020-SD: Chromium | 7440-47-3 | 50 mg/kg | 105 | 70.0 | 130 |
| | | EG020-SD: Copper | 7440-50-8 | 250 mg/kg | 96.2 | 70.0 | 130 |
| | | EG020-SD: Lead | 7439-92-1 | 250 mg/kg | 94.9 | 70.0 | 130 |
| | | EG020-SD: Nickel | 7440-02-0 | 50 mg/kg | 101 | 70.0 | 130 |
| | | EG020-SD: Zinc | 7440-66-6 | 250 mg/kg | 97.8 | 70.0 | 130 |
| **EP090: Organotin Compounds (QCLot: 5190661)** | | | | | | | |
| EB2321601-011 | Anonymous | EP090: Tributyltin | 56573-85-4 | 1.25 µgSn/kg | 113 | 20.0 | 130 |

Sub-Matrix: **WATER**

| Laboratory sample ID | Sample ID | Method: Compound | CAS Number | Matrix Spike (MS) Report: Spike Concentration | SpikeRecovery(%): MS | Acceptable Limits (%): Low | Acceptable Limits (%): High |
|---|---|---|---|---|---|---|---|
| **EP080/071: Total Petroleum Hydrocarbons (QCLot: 5183488)** | | | | | | | |
| ES2323929-001 | Anonymous | EP080: C6 - C9 Fraction | ---- | 325 µg/L | 112 | 70.0 | 130 |

Sub-Matrix: **WATER**

| | | | | Matrix Spike (MS) Report | | | |
|---|---|---|---|---|---|---|---|
| | | | | Spike | SpikeRecovery(%) | Acceptable Limits (%) | |
| *Laboratory sample ID* | *Sample ID* | *Method: Compound* | *CAS Number* | *Concentration* | *MS* | *Low* | *High* |
| **EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5183488)** | | | | | | | |
| ES2323929-001 | Anonymous | EP080: C6 - C10 Fraction | C6_C10 | 375 µg/L | 114 | 70.0 | 130 |
| **EP080: BTEXN (QCLot: 5183488)** | | | | | | | |
| ES2323929-001 | Anonymous | EP080: Benzene | 71-43-2 | 25 µg/L | 111 | 70.0 | 130 |
| | | EP080: Toluene | 108-88-3 | 25 µg/L | 114 | 70.0 | 130 |
| | | EP080: Ethylbenzene | 100-41-4 | 25 µg/L | 115 | 70.0 | 130 |
| | | EP080: meta- & para-Xylene | 108-38-3<br>106-42-3 | 25 µg/L | 108 | 70.0 | 130 |
| | | EP080: ortho-Xylene | 95-47-6 | 25 µg/L | 115 | 70.0 | 130 |
| | | EP080: Naphthalene | 91-20-3 | 25 µg/L | 112 | 70.0 | 130 |

# QA/QC Compliance Assessment to assist with Quality Review

| | | | |
|---|---|---|---|
| **Work Order** | : **ES2324044** | Page | : 1 of 6 |
| Client | : **ROBERT CARR & ASSOCIATES P/L** | Laboratory | : Environmental Division Sydney |
| Contact | : MS LAURA SCHOFIELD | Telephone | : +61-2-8784 8555 |
| Project | : 14302 | Date Samples Received | : 19-Jul-2023 |
| Site | : Trinity point | Issue Date | : 02-Aug-2023 |
| Sampler | : ---- | No. of samples received | : 8 |
| Order number | : ---- | No. of samples analysed | : 8 |

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

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

## *Summary of Outliers*

### *Outliers : Quality Control Samples*

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

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

### *Outliers : Analysis Holding Time Compliance*

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

### *Outliers : Frequency of Quality Control Samples*

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

## *Outliers : Frequency of Quality Control Samples*

Matrix: **SOIL**

| Quality Control Sample Type / Method | Count QC | Count Regular | Rate (%) Actual | Rate (%) Expected | Quality Control Specification |
|---|---|---|---|---|---|
| **Laboratory Duplicates (DUP)** | | | | | |
| Moisture Content | 1 | 11 | 9.09 | 10.00 | NEPM 2013 B3 & ALS QC Standard |

Matrix: **WATER**

| Quality Control Sample Type / Method | Count QC | Count Regular | Rate (%) Actual | Rate (%) Expected | Quality Control Specification |
|---|---|---|---|---|---|
| **Laboratory Duplicates (DUP)** | | | | | |
| TRH - Semivolatile Fraction | 0 | 17 | 0.00 | 10.00 | NEPM 2013 B3 & ALS QC Standard |
| **Matrix Spikes (MS)** | | | | | |
| TRH - Semivolatile Fraction | 0 | 17 | 0.00 | 5.00 | NEPM 2013 B3 & ALS QC Standard |

# *Analysis Holding Time Compliance*

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

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

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

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

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

| *Method* / *Container / Client Sample ID(s)* | *Sample Date* | *Extraction / Preparation* Date extracted | Due for extraction | Evaluation | *Analysis* Date analysed | Due for analysis | Evaluation |
|---|---|---|---|---|---|---|---|
| **EA055: Moisture Content (Dried @ 105-110°C)** | | | | | | | |
| **Soil Glass Jar - Unpreserved (EA055)** | | | | | | | |
| 072314302003 - Sed 1, 072304302004 - Sed 2, 072304302005 - Sed 3, 072304302006 - Sed 4, 072304302007 - Point A, 072304302008 - Point C | **19-Jul-2023** | **----** | ---- | **----** | **21-Jul-2023** | 02-Aug-2023 | ✓ |
| **EG005(ED093)-SD: Total Metals in Sediments by ICP-AES** | | | | | | | |
| **Soil Glass Jar - Unpreserved (EG005-SD)** | | | | | | | |
| 072314302003 - Sed 1, 072304302004 - Sed 2, 072304302005 - Sed 3, 072304302006 - Sed 4, 072304302007 - Point A, 072304302008 - Point C | **19-Jul-2023** | **24-Jul-2023** | 15-Jan-2024 | ✓ | **24-Jul-2023** | 15-Jan-2024 | ✓ |
| **EG020-SD: Total Metals in Sediments by ICPMS** | | | | | | | |
| **Soil Glass Jar - Unpreserved (EG020-SD)** | | | | | | | |
| 072314302003 - Sed 1, 072304302004 - Sed 2, 072304302005 - Sed 3, 072304302006 - Sed 4, 072304302007 - Point A, 072304302008 - Point C | **19-Jul-2023** | **24-Jul-2023** | 15-Jan-2024 | ✓ | **24-Jul-2023** | 15-Jan-2024 | ✓ |

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

| Method / Container / Client Sample ID(s) | Sample Date | Extraction / Preparation | | | Analysis | | |
|---|---|---|---|---|---|---|---|
| | | Date extracted | Due for extraction | Evaluation | Date analysed | Due for analysis | Evaluation |
| **EP003: Total Organic Carbon (TOC) in Soil** | | | | | | | |
| **Pulp Bag (EP003)** | | | | | | | |
| 072314302003 - Sed 1, 072304302004 - Sed 2, 072304302005 - Sed 3, 072304302006 - Sed 4, 072304302007 - Point A, 072304302008 - Point C | **19-Jul-2023** | **01-Aug-2023** | 16-Aug-2023 | ✓ | **01-Aug-2023** | 16-Aug-2023 | ✓ |
| **EP090: Organotin Compounds** | | | | | | | |
| **Soil Glass Jar - Unpreserved (EP090)** | | | | | | | |
| 072314302003 - Sed 1, 072304302004 - Sed 2, 072304302005 - Sed 3, 072304302006 - Sed 4, 072304302007 - Point A, 072304302008 - Point C | **19-Jul-2023** | **24-Jul-2023** | 02-Aug-2023 | ✓ | **25-Jul-2023** | 02-Sep-2023 | ✓ |

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

| Method / Container / Client Sample ID(s) | Sample Date | Extraction / Preparation | | | Analysis | | |
|---|---|---|---|---|---|---|---|
| | | Date extracted | Due for extraction | Evaluation | Date analysed | Due for analysis | Evaluation |
| **EP080/071: Total Petroleum Hydrocarbons** | | | | | | | |
| **Amber Glass Bottle - Unpreserved (EP071)** | | | | | | | |
| 072304302009 - MW5, 072304302010 - MW6 | **19-Jul-2023** | **24-Jul-2023** | 26-Jul-2023 | ✓ | **25-Jul-2023** | 02-Sep-2023 | ✓ |
| **Amber VOC Vial - Sulfuric Acid (EP080)** | | | | | | | |
| 072304302009 - MW5, 072304302010 - MW6 | **19-Jul-2023** | **24-Jul-2023** | 02-Aug-2023 | ✓ | **24-Jul-2023** | 02-Aug-2023 | ✓ |
| **EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions** | | | | | | | |
| **Amber Glass Bottle - Unpreserved (EP071)** | | | | | | | |
| 072304302009 - MW5, 072304302010 - MW6 | **19-Jul-2023** | **24-Jul-2023** | 26-Jul-2023 | ✓ | **25-Jul-2023** | 02-Sep-2023 | ✓ |
| **Amber VOC Vial - Sulfuric Acid (EP080)** | | | | | | | |
| 072304302009 - MW5, 072304302010 - MW6 | **19-Jul-2023** | **24-Jul-2023** | 02-Aug-2023 | ✓ | **24-Jul-2023** | 02-Aug-2023 | ✓ |
| **EP080: BTEXN** | | | | | | | |
| **Amber VOC Vial - Sulfuric Acid (EP080)** | | | | | | | |
| 072304302009 - MW5, 072304302010 - MW6 | **19-Jul-2023** | **24-Jul-2023** | 02-Aug-2023 | ✓ | **24-Jul-2023** | 02-Aug-2023 | ✓ |

# Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

| Quality Control Sample Type | | Count | | Rate (%) | | | Quality Control Specification |
|---|---|---|---|---|---|---|---|
| Analytical Methods | Method | QC | Regular | Actual | Expected | Evaluation | |
| **Laboratory Duplicates (DUP)** | | | | | | | |
| Moisture Content | EA055 | 1 | 11 | 9.09 | 10.00 | × | NEPM 2013 B3 & ALS QC Standard |
| Organotin Analysis | EP090 | 2 | 10 | 20.00 | 10.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Fe and Al in Sediments by ICPAES | EG005-SD | 1 | 6 | 16.67 | 10.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Metals in Sediments by ICPMS | EG020-SD | 1 | 6 | 16.67 | 10.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Organic Carbon | EP003 | 1 | 6 | 16.67 | 10.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| **Laboratory Control Samples (LCS)** | | | | | | | |
| Organotin Analysis | EP090 | 1 | 10 | 10.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Fe and Al in Sediments by ICPAES | EG005-SD | 1 | 6 | 16.67 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Metals in Sediments by ICPMS | EG020-SD | 1 | 6 | 16.67 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Organic Carbon | EP003 | 2 | 6 | 33.33 | 10.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| **Method Blanks (MB)** | | | | | | | |
| Organotin Analysis | EP090 | 1 | 10 | 10.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Fe and Al in Sediments by ICPAES | EG005-SD | 1 | 6 | 16.67 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Metals in Sediments by ICPMS | EG020-SD | 1 | 6 | 16.67 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Organic Carbon | EP003 | 1 | 6 | 16.67 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| **Matrix Spikes (MS)** | | | | | | | |
| Organotin Analysis | EP090 | 1 | 10 | 10.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Metals in Sediments by ICPMS | EG020-SD | 1 | 6 | 16.67 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

| Quality Control Sample Type | | Count | | Rate (%) | | | Quality Control Specification |
|---|---|---|---|---|---|---|---|
| Analytical Methods | Method | QC | Regular | Actual | Expected | Evaluation | |
| **Laboratory Duplicates (DUP)** | | | | | | | |
| TRH - Semivolatile Fraction | EP071 | 0 | 17 | 0.00 | 10.00 | × | NEPM 2013 B3 & ALS QC Standard |
| TRH Volatiles/BTEX | EP080 | 2 | 20 | 10.00 | 10.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| **Laboratory Control Samples (LCS)** | | | | | | | |
| TRH - Semivolatile Fraction | EP071 | 1 | 17 | 5.88 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| TRH Volatiles/BTEX | EP080 | 1 | 20 | 5.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| **Method Blanks (MB)** | | | | | | | |
| TRH - Semivolatile Fraction | EP071 | 1 | 17 | 5.88 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| TRH Volatiles/BTEX | EP080 | 1 | 20 | 5.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |
| **Matrix Spikes (MS)** | | | | | | | |
| TRH - Semivolatile Fraction | EP071 | 0 | 17 | 0.00 | 5.00 | × | NEPM 2013 B3 & ALS QC Standard |
| TRH Volatiles/BTEX | EP080 | 1 | 20 | 5.00 | 5.00 | ✓ | NEPM 2013 B3 & ALS QC Standard |

## Brief Method Summaries

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

| Analytical Methods | Method | Matrix | Method Descriptions |
|---|---|---|---|
| Moisture Content | EA055 | SOIL | In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3). |
| Total Fe and Al in Sediments by ICPAES | EG005-SD | SOIL | In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM Schedule B(3). LORs per NODG |
| Total Metals in Sediments by ICPMS | EG020-SD | SOIL | In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector. Analyte list and LORs per NODG. |
| Total Organic Carbon | EP003 | SOIL | In house C-IR17. Dried and pulverised sample is reacted with acid to remove inorganic Carbonates, then combusted in a furnace in the presence of strong oxidants / catalysts. The evolved (Organic) Carbon (as CO2) is automatically measured by infra-red detector. |
| Organotin Analysis | EP090 | SOIL | In house: Referenced to USEPA SW 846 - 8270 Prepared sample extracts are analysed by GC/MS coupled with high volume injection, and quanitified against an established calibration curve. |
| TRH - Semivolatile Fraction | EP071 | WATER | In house: Referenced to USEPA SW 846 - 8015 The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM Schedule B(3) |
| TRH Volatiles/BTEX | EP080 | WATER | In house: Referenced to USEPA SW 846 - 8260 Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM Schedule B(3) |

| Preparation Methods | Method | Matrix | Method Descriptions |
|---|---|---|---|
| Hot Block Digest for metals in soils sediments and sludges | EN69 | SOIL | In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM Schedule B(3). |
| Dry and Pulverise (up to 100g) | GEO30 | SOIL | # |
| Organotin Sample Preparation | ORG35 | SOIL | In house: 20g sample is spiked with surrogate and leached in a methanol:acetic acid:UHP water mix and vacuum filtered. Reagents and solvents are added to the sample and the mixture tumbled. The butyltin compounds are simultaneously derivatised and extracted. The extract is further extracted with petroleum ether. The resultant extracts are combined and concentrated for analysis. |
| Separatory Funnel Extraction of Liquids | ORG14 | WATER | In house: Referenced to USEPA SW 846 - 3510 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM Schedule B(3) . ALS default excludes sediment which may be resident in the container. |

| *Preparation Methods* | *Method* | *Matrix* | *Method Descriptions* |
|---|---|---|---|
| Volatiles Water Preparation | ORG16-W | WATER | A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for purging. |

# CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| **Work Order** | : **ES2328903** | Page | : 1 of 4 |
| Client | : **ROBERT CARR & ASSOCIATES P/L** | Laboratory | : Environmental Division Sydney |
| Contact | : LAURA SCHOFIELD | Contact | : Customer Services ES |
| Address | : 92 HILL STREET<br>CARRINGTON NSW 2294 | Address | : 277-289 Woodpark Road Smithfield NSW Australia 2164 |
| Telephone | : +61 2 4902 9200 | Telephone | : +61-2-8784 8555 |
| Project | : 14302 | Date Samples Received | : 19-Jul-2023 13:21 |
| Order number | : ---- | Date Analysis Commenced | : 29-Aug-2023 |
| C-O-C number | : ---- | Issue Date | : 31-Aug-2023 12:39 |
| Sampler | : ---- | | |
| Site | : Trinity Point | | |
| Quote number | : SYBQ/400/21 | | |
| No. of samples received | : 6 | | |
| No. of samples analysed | : 6 | | |

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

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

## *Signatories*

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

| *Signatories* | *Position* | *Accreditation Category* |
|---|---|---|
| Ankit Joshi | Senior Chemist - Inorganics | Sydney Inorganics, Smithfield, NSW |

## General Comments

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

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

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

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

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

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

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

## Analytical Results

| Sub-Matrix: SEDIMENT (Matrix: SOIL) | | | Sample ID | 072314302003 Sed 1 | 072314302004 Sed 2 | 072314302005 Sed 3 | 072314302006 Sed 4 | 072314302007 Point A |
|---|---|---|---|---|---|---|---|---|
| | | | Sampling date / time | 19-Jul-2023 00:00 | 19-Jul-2023 00:00 | 19-Jul-2023 00:00 | 19-Jul-2023 00:00 | 19-Jul-2023 00:00 |
| Compound | CAS Number | LOR | Unit | ES2328903-001 | ES2328903-002 | ES2328903-003 | ES2328903-004 | ES2328903-005 |
| | | | | Result | Result | Result | Result | Result |
| **EA055: Moisture Content (Dried @ 105-110°C)** | | | | | | | | |
| Moisture Content | ---- | 0.1 | % | **73.2** | **44.7** | **48.0** | **65.6** | **32.8** |
| **EG035T: Total Recoverable Mercury by FIMS** | | | | | | | | |
| Mercury | 7439-97-6 | 0.01 | mg/kg | **0.08** | **0.04** | **0.04** | **0.06** | **0.03** |

## Analytical Results

| Sub-Matrix: SEDIMENT (Matrix: SOIL) | | | | Sample ID | 072314302008 Point C | ---- | ---- | ---- | ---- |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Sampling date / time | 19-Jul-2023 00:00 | ---- | ---- | ---- | ---- |
| Compound | CAS Number | LOR | Unit | | ES2328903-006 | -------- | -------- | -------- | -------- |
| | | | | | Result | ---- | ---- | ---- | ---- |
| **EA055: Moisture Content (Dried @ 105-110°C)** | | | | | | | | | |
| Moisture Content | ---- | 0.1 | % | | **61.9** | **----** | **----** | **----** | **----** |
| **EG035T: Total Recoverable Mercury by FIMS** | | | | | | | | | |
| Mercury | 7439-97-6 | 0.01 | mg/kg | | **0.06** | **----** | **----** | **----** | **----** |

# QUALITY CONTROL REPORT

| | | | |
|---|---|---|---|
| **Work Order** | : **ES2328903** | Page | : 1 of 3 |
| Client | : **ROBERT CARR & ASSOCIATES P/L** | Laboratory | : Environmental Division Sydney |
| Contact | : LAURA SCHOFIELD | Contact | : Customer Services ES |
| Address | : 92 HILL STREET<br>CARRINGTON NSW 2294 | Address | : 277-289 Woodpark Road Smithfield NSW Australia 2164 |
| Telephone | : +61 2 4902 9200 | Telephone | : +61-2-8784 8555 |
| Project | : 14302 | Date Samples Received | : 19-Jul-2023 |
| Order number | : ---- | Date Analysis Commenced | : 29-Aug-2023 |
| C-O-C number | : ---- | Issue Date | : 31-Aug-2023 |
| Sampler | : ---- | | |
| Site | : Trinity Point | | |
| Quote number | : SYBQ/400/21 | | |
| No. of samples received | : 6 | | |
| No. of samples analysed | : 6 | | |

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

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

This Quality Control Report contains the following information:

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

## *Signatories*

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

| *Signatories* | *Position* | *Accreditation Category* |
|---|---|---|
| Ankit Joshi | Senior Chemist - Inorganics | Sydney Inorganics, Smithfield, NSW |

## General Comments

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

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

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

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

## Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

| | | | | Laboratory Duplicate (DUP) Report | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| *Laboratory sample ID* | *Sample ID* | *Method: Compound* | *CAS Number* | *LOR* | *Unit* | *Original Result* | *Duplicate Result* | *RPD (%)* | *Acceptable RPD (%)* |
| **EG035T: Total Recoverable Mercury by FIMS (Low Level) (QC Lot: 5265113)** | | | | | | | | | |
| ES2328903-001 | 072314302003 Sed 1 | EG035T-LL: Mercury | 7439-97-6 | 0.01 | mg/kg | 0.08 | 0.07 | 0.0 | No Limit |
| **EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 5265115)** | | | | | | | | | |
| ES2328896-002 | Anonymous | EA055: Moisture Content | ---- | 0.1 | % | 2.7 | 2.9 | 10.1 | No Limit |
| ES2328925-003 | Anonymous | EA055: Moisture Content | ---- | 0.1 | % | 11.3 | 11.9 | 5.0 | 0% - 50% |

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

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

Sub-Matrix: **SOIL**

| | | | | Method Blank (MB) Report | Laboratory Control Spike (LCS) Report | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Spike | Spike Recovery (%) | Acceptable Limits (%) | |
| Method: Compound | CAS Number | LOR | Unit | Result | Concentration | LCS | Low | High |
| **EG035T: Total Recoverable Mercury by FIMS (Low Level) (QCLot: 5265113)** | | | | | | | | |
| EG035T-LL: Mercury | 7439-97-6 | 0.01 | mg/kg | <0.01 | 0.087 mg/kg | 100 | 72.0 | 116 |

## Matrix Spike (MS) Report

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

Sub-Matrix: **SOIL**

| | | | | Matrix Spike (MS) Report | | | |
|---|---|---|---|---|---|---|---|
| | | | | Spike | SpikeRecovery(%) | Acceptable Limits (%) | |
| Laboratory sample ID | Sample ID | Method: Compound | CAS Number | Concentration | MS | Low | High |
| **EG035T: Total Recoverable Mercury by FIMS (Low Level) (QCLot: 5265113)** | | | | | | | |
| ES2328903-001 | 072314302003 Sed 1 | EG035T-LL: Mercury | 7439-97-6 | 0.05 mg/kg | 106 | 70.0 | 130 |

# QA/QC Compliance Assessment to assist with Quality Review

| | | | |
|---|---|---|---|
| **Work Order** | : **ES2328903** | Page | : 1 of 4 |
| Client | : **ROBERT CARR & ASSOCIATES P/L** | Laboratory | : Environmental Division Sydney |
| Contact | : LAURA SCHOFIELD | Telephone | : +61-2-8784 8555 |
| Project | : 14302 | Date Samples Received | : 19-Jul-2023 |
| Site | : Trinity Point | Issue Date | : 31-Aug-2023 |
| Sampler | : ---- | No. of samples received | : 6 |
| Order number | : ---- | No. of samples analysed | : 6 |

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

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

## *Summary of Outliers*

### *Outliers : Quality Control Samples*

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

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

### *Outliers : Analysis Holding Time Compliance*

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

### *Outliers : Frequency of Quality Control Samples*

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

## Outliers : Analysis Holding Time Compliance

Matrix: **SOIL**

| Method / Container / Client Sample ID(s) | | Extraction / Preparation | | | Analysis | | |
|---|---|---|---|---|---|---|---|
| | | Date extracted | Due for extraction | Days overdue | Date analysed | Due for analysis | Days overdue |
| **EA055: Moisture Content (Dried @ 105-110°C)** | | | | | | | |
| **Soil Glass Jar - Unpreserved** | | | | | | | |
| 072314302003 - Sed 1, | 072314302004 - Sed 2, | ---- | ---- | ---- | 29-Aug-2023 | 02-Aug-2023 | **27** |
| 072314302005 - Sed 3, | 072314302006 - Sed 4, | | | | | | |
| 072314302007 - Point A, | 072314302008 - Point C | | | | | | |
| **EG035T: Total Recoverable Mercury by FIMS** | | | | | | | |
| **Soil Glass Jar - Unpreserved** | | | | | | | |
| 072314302003 - Sed 1, | 072314302004 - Sed 2, | 29-Aug-2023 | 16-Aug-2023 | **13** | 31-Aug-2023 | 16-Aug-2023 | **15** |
| 072314302005 - Sed 3, | 072314302006 - Sed 4, | | | | | | |
| 072314302007 - Point A, | 072314302008 - Point C | | | | | | |

# Analysis Holding Time Compliance

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

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

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

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

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

| Method / Container / Client Sample ID(s) | | Sample Date | Extraction / Preparation | | | Analysis | | |
|---|---|---|---|---|---|---|---|---|
| | | | Date extracted | Due for extraction | Evaluation | Date analysed | Due for analysis | Evaluation |
| **EA055: Moisture Content (Dried @ 105-110°C)** | | | | | | | | |
| **Soil Glass Jar - Unpreserved (EA055)** | | | | | | | | |
| 072314302003 - Sed 1, | 072314302004 - Sed 2, | **19-Jul-2023** | **----** | ---- | **----** | **29-Aug-2023** | 02-Aug-2023 | × |
| 072314302005 - Sed 3, | 072314302006 - Sed 4, | | | | | | | |
| 072314302007 - Point A, | 072314302008 - Point C | | | | | | | |
| **EG035T: Total Recoverable Mercury by FIMS** | | | | | | | | |
| **Soil Glass Jar - Unpreserved (EG035T-LL)** | | | | | | | | |
| 072314302003 - Sed 1, | 072314302004 - Sed 2, | **19-Jul-2023** | **29-Aug-2023** | 16-Aug-2023 | × | **31-Aug-2023** | 16-Aug-2023 | × |
| 072314302005 - Sed 3, | 072314302006 - Sed 4, | | | | | | | |
| 072314302007 - Point A, | 072314302008 - Point C | | | | | | | |

# Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

| Quality Control Sample Type | | Count | | Rate (%) | | | Quality Control Specification |
|---|---|---|---|---|---|---|---|
| *Analytical Methods* | *Method* | *QC* | *Regular* | ***Actual*** | ***Expected*** | *Evaluation* | |
| Laboratory Duplicates (DUP) | | | | | | | |
| Moisture Content | EA055 | 2 | 15 | **13.33** | **10.00** | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Total Mercury by FIMS (Low Level) | EG035T-LL | 1 | 6 | **16.67** | **10.00** | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Laboratory Control Samples (LCS) | | | | | | | |
| Total Mercury by FIMS (Low Level) | EG035T-LL | 1 | 6 | **16.67** | **5.00** | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Method Blanks (MB) | | | | | | | |
| Total Mercury by FIMS (Low Level) | EG035T-LL | 1 | 6 | **16.67** | **5.00** | ✓ | NEPM 2013 B3 & ALS QC Standard |
| Matrix Spikes (MS) | | | | | | | |
| Total Mercury by FIMS (Low Level) | EG035T-LL | 1 | 6 | **16.67** | **5.00** | ✓ | NEPM 2013 B3 & ALS QC Standard |

## Brief Method Summaries

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

| *Analytical Methods* | *Method* | *Matrix* | *Method Descriptions* |
|---|---|---|---|
| Moisture Content | EA055 | SOIL | In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3). |
| Total Mercury by FIMS (Low Level) | EG035T-LL | SOIL | In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3) |

| *Preparation Methods* | *Method* | *Matrix* | *Method Descriptions* |
|---|---|---|---|
| Hot Block Digest for metals in soils sediments and sludges | EN69 | SOIL | In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM Schedule B(3). |

5670
#1-6

Fadi

25/8/23
1:30pm

## Fadi Soro

**From:** Khaleda Ataei
**Sent:** Friday, 25 August 2023 1:21 PM
**To:** Samples Sydney; rebatches.sydney
**Subject:** ALS Workorder ES2324044, Client ROBCAR, Project 14302

Hi Team,

Can you please re-batch the sediment samples to report Mercury?

Thanks

Kind regards,

1. Sed 1
2. Sed 2
3. Sed 3
4. Sed 4
5. Pond A
6. Pond C

Environmental Division
Sydney
Work Order Reference
ES2328903

Telephone : +61-2-8784 8555


right solutions. right partner.

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