

## MP07\_0171 MOD 2 Hexham Train Support Facility


### Operational Compliance Report (2023)

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15 March 2024



## Plan Approval Table

Position	Name	Signature	Date
Principal Adviser Environment	Harry Egan		15/03/24

## Revision History

Rev	Date	Author	Comments
1	15/03/24	Harry Egan	Final

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# Glossary

Term	Definitions
Aurizon	Aurizon Operations Pty Ltd
the Approval	MP07_0171 MOD 2
CWR	Coal Washery Reject
DAF	Dissolved Aeration Flotation
DPE	Department of Planning and Environment
EPL	Environmental Protection Licence
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
Hexham Train Support Facility	The Site
IEA	630.30267-R01-Hexham TSF Independent Environmental Audit 2021
OCR	Operational Compliance Report
OEMP	Operational Environmental Management Plan
SGMP	Surface and Groundwater Management Plan
the Site	Aurizon Hexham Train Support Facility
SMP	Site Management Plan
SSI	State Significant Infrastructure
TSF	Train Support Facility

## 1.0 Introduction

### 1.1 Site Description

The Aurizon Operations Pty Ltd (**Aurizon**) Hexham Train Support Facility (**the Site**) has a total area of 255ha and is located at Hexham approximately 16km north-west of the Newcastle Central Business District.

The Site shares borders with the Main Northern Railway and Pacific Highway to the east and the New England Highway to the north. To the south and west rural properties and the Hexham Swamp Nature Reserve are adjacent. The Site is located within a predominantly industrial setting, with only a small number of residential dwellings within the local vicinity.

The Site's history as a coal handling facility has resulted in the southern portion of the site containing an abandoned rail loop corridor and coal washery reject (**CWR**). CWR is retained within vegetated stockpiles, however, it is also present extensively in sub surface deposits. Remediation completed during the construction of the Site infrastructure has resulted in excavated CWR and potential acid sulphate soil being stockpiled in the southern portion of the site.

Infrastructure associated with the Site is restricted to approximately 38 hectares and consists of:

- seven train tracks (10.5 kilometres) parallel to the existing mainline, turning angle and a shunt track;
- a provisioning building, service vehicle garage and combined maintenance/administrative centre;
- surface water management infrastructure including retention basins;
- bulk fuel storage area;
- operational sign on depot;
- long term wagon stowage area; and
- a wastewater treatment plant with on-site effluent irrigation and dissolved aeration floatation plant (DAF).

Brancourts Manufacturing and Processing Pty Ltd are currently licensed to use a portion of the site for a waste water treatment plant and effluent irrigation area under Environmental Protection Licence (EPL) 816. Effluent is irrigated over the above mentioned CWR stockpiles.



Figure 1 - Site Layout

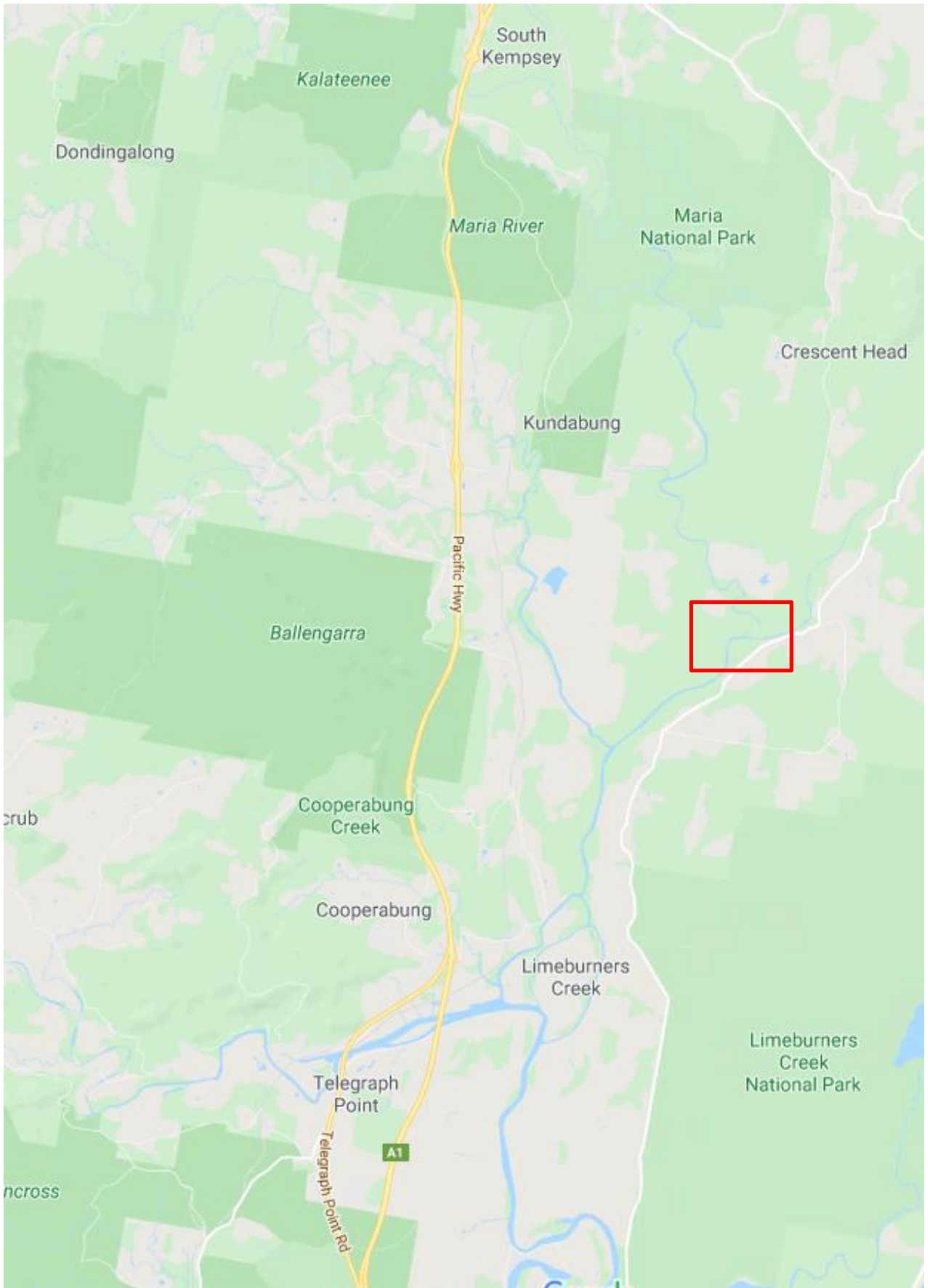


Figure 2 - Indicative Offset Site (red box) - Lot 49 DP 754431 / Lot 1 DP 127907



## 1.2 Operational Activities

The Site provides routine and ad hoc provisioning and maintenance services for outbound locomotives and wagons at its Provisioning and Combined Maintenance Facilities (**CMF**) respectively. Additional provisioning is undertaken at identified and prepared direct into locomotive refuelling locations as required.

An operations depot is also located adjacent to the CMF. The depot facilitates business support functions and on network operational activities inclusive of crew sign on.

The treatment of generated septic and operational wastewater is undertaken onsite through the utilisation of a septic treatment plant and DAF plant respectively.

## 1.3 Legislative Context

The project was assessed and approved as State Significant Infrastructure (**SSI**) under Part 5.1 of the *Environmental Planning and Assessment Act 1979 (EP&A Act)*.

The Site was approved by a delegate of the Minister for Planning and Infrastructure under MP07\_0171, dated 10 October 2013. The Hexham TSF Turning Angle (**the Turning Angle**) Modification MP 07\_0171 MOD 1 (SSI-6090) was approved on the 09 October 2019 with The Hexham Depot and Wagon Stowage Area Modification MP 07\_0171 MOD 2 (**the Approval**) approved in September 2022.

The Approval permitted the ongoing operation of the TSF and simultaneous construction/operation of the operations depot and wagon stowage area.

This Operational Compliance Report (**OCR**) covers the period 01 January 2023 to 31 December 2023. This report has been developed to comply with Condition D5 of the Approval and Section 4.1 of the Operational Environmental Management Plan (**OEMP**). Project information is detailed in Table 1.

**Table 1 - Project Information**

Criteria	Information
Project Name	Aurizon Hexham Train Support Facility
Construction Start Date	2014
Operational Date	2014/15 - Ongoing
Site Address	Off Anderson Drive, Hexham, NSW, 2322
Project Application Number	State Significant Infrastructure MP07_0171 (SSI 6090) MOD 2
Compliance Report	MP07_0171 MOD 2 Operational Compliance Report (2023)
Project Phase	Operation and construction (MOD 2 depot infrastructure only)
Reporting Period	01 January 2023 – 31 December 2023

## 1.4 Key Project Personnel

The key project personnel who are responsible for environmental management of the Project are listed in Table 2 below.

**Table 2 - Key Project Personnel**

Name	Company	Position	Contact Details
Craig Tuffley	Aurizon	Regional Maintenance Manager	Upon request
Harry Egan	Aurizon	Senior Adviser Environment	Upon request

## 2.0 Site Activities

### 2.1 Activities During the Reporting Period

Activities undertaken during the reporting period and planned for 2024 calendar year are listed in Table 3 below.

**Table 3 - Summary of Reporting Period Project Activities**

Calendar Year	Activity	Comment	Activity Status
2022/23	Hexham Train Facility Mod 2 - Depot Relocation and Wagon Stowage(SSI-6090- Mod-2)	Construction of approved infrastructure	Complete
2023	OEMP update	OEMP and supporting documents approved in 2023.	Complete
2023	Hexham Coal Washery Reject Consistency Review	Review found that export of fill disturbed as part of TSF construction activities is permitted to be exported to M1RT project without need for modification to the Approval.	Complete
2023	Hexham Depot commissioning	Relocation of Mayfield workforce to constructed Hexham Depot. In August.	Complete
2023/24	Routine maintenance and provisioning activities	Refer Section 1.2	Ongoing
2023/24	Surface and Groundwater Monitoring	Refer Section 3.0	Ongoing
2024	Construction of pervious short term wagon stowage laydown area	Preparation of former turning angle construction and laydown area for temporary storage of wagons scheduled for repair following December 2023 on network derailment.	Commenced
2024	Coal washery reject export	Export of stockpiled CWR disturbed during construction activities to the adjacent M1RT project under an EPA site specific exemption.	Scheduled
2024	Independent Environmental Audit	IEA completed as required by OEMP Section 4.2 and Condition D5(d) of the Approval	Scheduled

## 2.2 DPE Requests 2022

Following review of the 2022 OCR and MOD 2 Pre-Operations Compliance Report the Department of Planning and Environment (**DPE**), in compliance with Condition B3 of the Approval, requested the following additional information be included in the 2023 OCR and actions taken as per Table 4 below.

**Table 4 - DPE 2023 Requests**

Request	Section	Comment
Make publicly available a copy of the 2022 Operational Compliance Report on the company website.	N/A	Complete
Please include an update on actions identified in previous independent audits and compliance reports, in accordance with Schedule D, Condition D5A. Section 3.3 and Appendix 4 of the Pre-Operation Compliance Report do not provide an update on actions identified in the previous construction compliance report. Additionally, the completion dates have lapsed.	2.4	Complete

## 2.3 OEMP and CEMP Updates

The Site OEMP documentation was reviewed and updated in February 2023 to accommodate the site depot commencing operation. Updates have been detailed in Table 5 below.

**Table 5 - OEMP and Supporting Document Updates**

Management Plan (MP)	Section	Update Details	Justification
Flood Emergency MP	Various	General update.	MOD 2 approval requirement.
Fauna and Flora MP	Various	General update.	MOD 2 approval requirement
Operations Environmental MP	Various	General update.	MOD 2 approval requirement
Surface and Groundwater Monitoring Plan	Various	General update.	MOD 2 approval requirement
Site MP	Various	General update.	MOD 2 approval requirement
Stormwater MP	Various	General update.	MOD 2 approval requirement
Waste MP	Various	General update.	MOD 2 approval requirement

## 2.4 2021 IEA and Compliance Report Actions Status

Actions relating to non-compliances and recommendations for improvement which have not been previously reported as being closed out are detailed in Table 6.

**Table 6 - IEA 2022 Response to Auditor Recommendations and Compliance Report Actions Update**

Action	Recommendation	Comment	Status
2022 OCR	Make publicly available a copy of the 2022 Operational Compliance Report on the company website.		Complete
Mod 2 - Pre-Operations Compliance Report	Please include an update on actions identified in previous independent audits and compliance reports, in accordance with Schedule D, Condition D5A. Section 3.3 and Appendix 4 of the Pre-Operation Compliance Report do not provide an update on actions identified in the previous construction compliance report. Additionally, the completion dates have lapsed.	This table	Complete
IEA IMP 5	<p>Review management plans to ensure:</p> <ul style="list-style-type: none"> <li>• A reference table referring to consent conditions is included;</li> <li>• Where conditions are not addressed, include justification as to why;</li> <li>• Cross references in management plans are correct;</li> <li>• All Appendixes are attached to management plans published on the website;</li> <li>• Full names of acronyms used in the report are included;</li> <li>• Other management plans are correctly referenced within the document;</li> <li>• A full reference list is included in every Management Plan; and</li> <li>• Document control including version and date is consistent throughout.</li> </ul>	<p>CEMPs approved in September 2022.</p> <p>OEMP reviewed and approved in 2023.</p>	Complete
IEA IMP 6	Some areas of legacy waste were identified at the site which are recommended for removal.	Head walls and waste tyres removed in 2023.	Complete

## 3.0 Surface and Groundwater Monitoring

### 3.1 Legislative Context

Aurizon is required to undertake surface and groundwater monitoring of the project site during construction and for three years following commencement of the Site's operation in compliance with Condition C19 of the Approval and the approved Hexham Surface and Groundwater Monitoring Plan (**SGMP**).

### 3.2 Monitoring Network

Surface and groundwater monitoring locations and monitoring frequencies are detailed in Table 7 below with a site layout showing monitoring locations included as Figure 3.

**Table 7 - Monitoring Network and Program**

Site	Type	Easting	Northing	Monitoring Frequency
MW01R	Groundwater	377080	6365705	Quarterly
MW301R	Groundwater	376564	6367446	Quarterly
MW302R	Groundwater	376918	6366499	Quarterly
MW307R	Groundwater	376287	6366363	Quarterly
MW308R	Groundwater	376405	6365896	Quarterly
MW109	Groundwater	376273	6368095	Quarterly
MW106R	Groundwater	376758	6366928	Quarterly
MW02	Groundwater	376711	6365816	Quarterly
101R	Groundwater	377110	6365956	Quarterly
MW108R	Groundwater	376083	6366960	Quarterly
MW101R	Groundwater	376282	6367404	Quarterly
SW1	Surface Water	376210	6368225	Quarterly
SW2	Surface Water	375612	6368068	Quarterly
SW3	Surface Water	375884	6367384	Quarterly
SW4	Surface Water	376197	6366571	Quarterly
SW4A	Surface Water	376222	6366553	Quarterly
SW05	Surface Water	377144	6365655	Quarterly
SW6	Surface Water	376411	6365873	Quarterly

Site	Type	Easting	Northing	Monitoring Frequency
SW07	Surface Water	376680	6365799	Quarterly
SW8	Surface Water	377474	6365420	Quarterly
SW9	Surface Water	377496	6365387	Quarterly
SW10	Surface Water	376776	6367600	Quarterly
SW11	Surface Water	375433	6367878	Quarterly
Basin 1	Surface Water	376205	6367977	Monthly
Basin 2	Surface Water	376481	6367284	Monthly
Basin 3	Surface Water	377038	6365758	Monthly

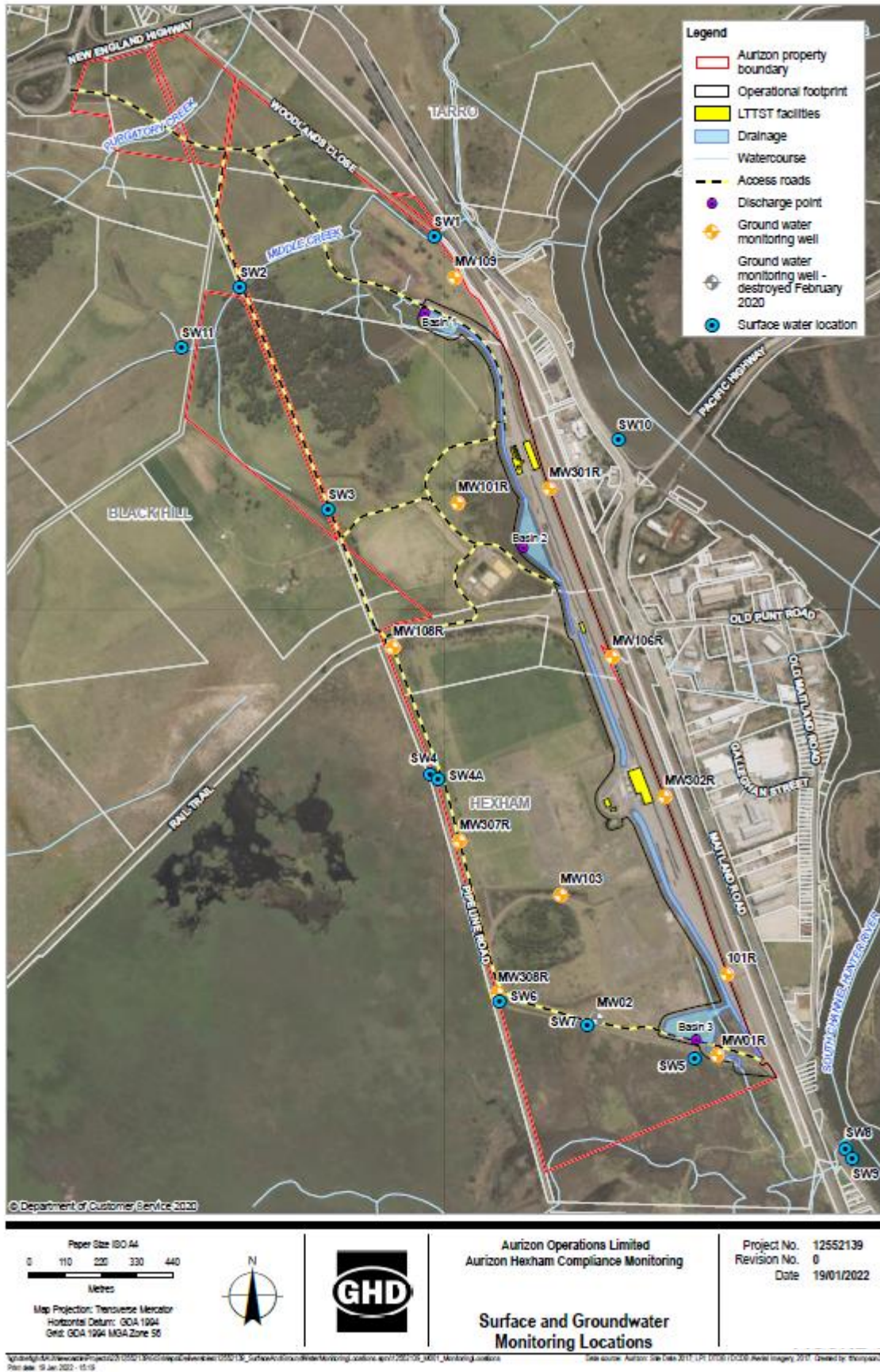


Figure 3 - Surface and Groundwater Monitoring Locations



### 3.3 Meteorology

Rainfall data was assessed from Hexham Bridge (Manly Hydraulics Lab), which is considered to be representative in relation to its proximity to the site, as summarised in Figure 4. Hexham Bridge station recorded a total annual rainfall of 704.5 mm for 2023, which was lower than the previous year's total of 1389.5 mm.

As per the SGMP, greater than 75 mm of rainfall over a period of five consecutive days is a considered significant rainfall event and triggers the requirement for surface water monitoring. Rainfall is tracked via the MHL website ([www.mhl.nsw.gov.au/Station-210448](http://www.mhl.nsw.gov.au/Station-210448)) which provides live records for a 5-day period only. Based on this tracking, one significant rainfall event was recorded in February 2023, resulting in subsequent surface water monitoring being conducted on 24 February 2023.

In Q4 2023, the record was subsequently updated such that an exceedance of the 75 mm trigger was recorded on 12 November 2023 (76.5 mm). No exceedance was reported in the real-time tracking hence no rainfall response monitoring was initiated. MHL has advised that data is adjusted, if required, using the observer readings of the actual water level against a known datum. Gaps in rainfall data can also occur due to equipment damage, telemetry or logger problems or other site issues. Still, a routine surface water monitoring event was conducted on 14 November 2023, in which only one of the three basins contained water.

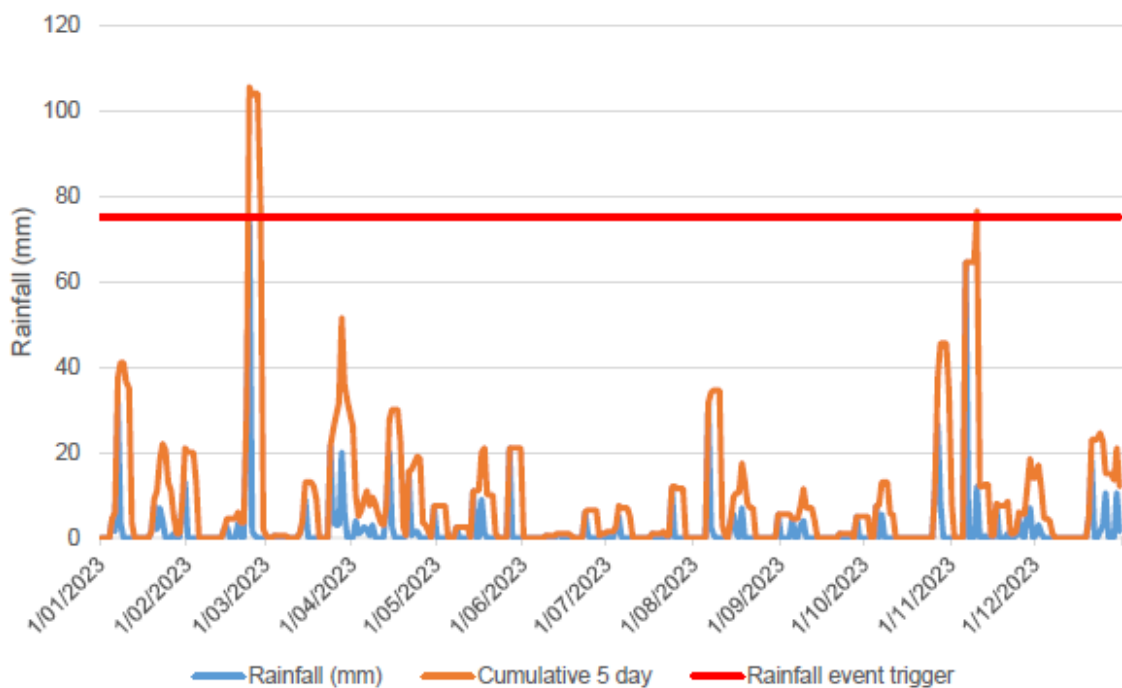


Figure 2.1 2023 Annual rainfall summary – Hexham Bridge (Station 210448<sup>2</sup>)

Figure 4 - Annual Rainfall Summary – Hexham Bridge (Station 210448)

### 3.4 Results

Surface and groundwater monitoring was undertaken in general accordance with the SGMP. Two rainfall monitoring events were triggered due rainfall events (when rainfall >75 mm over a period of 5 days). A summary of the compliance summary for water monitoring is detailed in Table 8 below.

**Table 8 - Surface and Groundwater Scheduled Monitoring Compliance Summary**

Monitoring	Parameters	Frequency	Compliance	Compliance
Surface water monitoring SW1 to SW11	Field analytes	Quarterly and rainfall events	Yes	
	Laboratory analytes	Quarterly and rainfall events	No	Thermotolerant (Faecal) Coliforms were sampled during the monthly event (28 February 2023) not the rainfall response event (24 February 2023) to achieve analysis within holding times.
Water quality control basins 1 - 3	Field analytes	Monthly	No	Field turbidity was not gauged in the November monthly and December quarterly events as the incorrect WQM was supplied and at select wells during the March quarterly event due to an equipment malfunction.
	Laboratory analytes	Quarterly and Rainfall	No	Thermotolerant (Faecal) Coliforms were sampled during the monthly event (28 February) not the rainfall response event (24 February) to achieve analysis within holding times.
Groundwater monitoring	Field analytes	Quarterly	No	Field turbidity was not gauged in the November monthly and December quarterly events as the incorrect WQM was supplied and at select wells during the March quarterly event due to an equipment malfunction.
	Laboratory analytes	Quarterly	No	Thermotolerant (Faecal) Coliforms were sampled during the monthly event (28 February) not the rainfall response event (24 February) to achieve analysis within holding times.
	Depth	Quarterly	No	MW308R blocked preventing SWL gauging.

A complete annual record of field parameters, analytical results including exceedances and data trends displayed in time series graphs is presented in Appendix A – Annual Water Monitoring Report (GHD, 27 February 2024).

A summary of the key results for the 2023 monitoring period are detailed in Sections 3.4.1 and 3.4.2 below.

### 3.4.1 Surface Water

A complete annual record of field parameters and analytical results for surface water is presented in the Annual Water Monitoring Report (GHD, 27 February 2024). The following key findings were noted in 2023:

- Basin 2 remained dry throughout 2023. Basin 3 was dry at the end of Q3 (September 2023) and through all of Q4. No flow was observed at SW locations SW1 to SW11 in 2023 except during the February 2023 rainfall event.

- Field pH ranged between 5.9 to 7.9 pH units, at all locations except for SW2, which recorded a pH value of 6.4 which was slightly below the adopted criteria during the 24 February rainfall event. All field and lab pH values were within historical range during 2023.
- Field turbidity exceeded the adopted assessment criteria at Basin 1, SW1, SW2, SW7 and SW9 during select Q1 monitoring events, however remained within historical ranges.
- Laboratory turbidity and total suspended solid (TSS) concentrations varied without trend throughout 2023 at several locations and intermittently exceeded assessment criteria (noting that SW locations SW1 to SW11 were only monitored during the February 2023 rainfall event due to lack of flow). All detections were consistent with historical records with the exception of TSS at Basin 3 during Q2 SW9 and SW11 during the February rainfall event and turbidity at SW2 during the February rainfall event. The presence of livestock proximal to sampling points and the influence of rainfall are considered possible causes for the fluctuation (e.g., concentration spikes occurring following significant rainfall).
- Most metal concentrations were consistent with historical records. Spike exceedances of several heavy metals at Basin 3 occurred throughout 2023 and several SW locations during the February 2023 rainfall event. Concentrations were largely within historical ranges with the exception of nickel at SW2, nickel and zinc at SW4 and SW11, iron and nickel at Basin 3, and arsenic at SW7 which recorded their highest historical values. Iron concentrations at Basin 3 have been increasing since Q1 2023, however this location was dry during Q3 and Q4 and not able to be sampled. These exceedances are likely related to the increase in turbidity.
- Nitrogen concentrations were generally below the DCA/DCB except for isolated spikes recorded at Basin 1 (Q1), Basin 3 (February rainfall event and Q2) and SW7 (February rainfall event). These exceedances typically coincided with increased rainfall observed during February, with the exception of Basin 3, which had the highest concentration observed since July 2021 during the Q2 event. The previous exceedances observed in 2021 to 2022 at Basin 1 decreased in 2023 following the Q1 spike, with concentrations below the DCB during the remaining 2023 events.
- Concentrations of BTEXN and PAHs were below the laboratory LOR at all surface water monitoring locations during 2023, consistent with historical data. Some detections of TRH fractions were noted at Basin 1 and Basin 3, consistent with historical intermittent detections. Concentrations of TRH C6-C36 exceeded the adopted assessment criteria (DCB) during the Q1 and Q2 events at Basin 3. Exceedances of the DCB have been previously observed at this location, however concentrations during Q2 2023 exceeded historical highs. As Basin 3 has been dry since August 2023, a concentration trend has not been able to be determined, however will be further evaluated in 2024 if able to be sampled, to likely include additional TRH silica gel cleanup analysis.
- Thermotolerant coliform concentrations exceeded historical highs and the adopted assessment criteria (DCA/DCB) at Basin 1, SW1, SW2, SW4A, SW6 and SW11. Elevated concentrations above the DCA/DCB were also recorded at Basin 3 during the Q1 sampling event and at most remaining surface water locations during the February rainfall event. These higher concentrations may reflect influence from adjacent agricultural areas (i.e. faecal matter from livestock).

### 3.4.2 Groundwater

Based on the field observations and results reported between 01 January 2023 and 31 December 2023, the following key groundwater findings are noted:

- Groundwater levels remained within historical ranges over 2023, with ongoing decreases noted in Q3 and Q4 (a down trend within historical ranges).

- Field pH ranged 5.1 to 7.3 during 2023. pH at MW02 remained below the adopted criteria (DCC) throughout 2023, consistent with historical records.
- Field electrical conductivity exceeded the adopted assessment criteria at MW01R (Q4 only) and MW101R and MW307R throughout 2023. Concentrations were within historical ranges except at MW101R which recorded a new high in Q4. Concentrations have been generally increasing since early to mid-2022 at locations MW101R, MW301R, and MW307R.
- Lab turbidity and TSS concentrations were below the DCC at all locations, except for an isolated spike within the historical range at MW101R in Q3, and an isolated spike in field turbidity, outside the historical range at MW01R in Q2. Levels returned to historical ranges thereafter.
- Exceedances of the DCC for aluminium, arsenic, cadmium, chromium, copper, and lead were observed at select monitoring wells throughout 2023. Heavy metal concentrations remained low, stable and within historical ranges, with the exception of aluminium at MW101R which was above the DCC and historical levels in Q4, arsenic which exceeded historical highs in Q1 at MW106R (although levels did drop throughout 2023) and cadmium at MW307R which exceeded criteria and historical highs in Q4. These analytes will be monitored in 2024 for any possible increasing trends.
- Nitrogen concentrations at MW307R exceeded DCC criteria throughout 2023 however remained within historical ranges. Concentrations at MW307R increased in Q3 and Q4 but remain below the maximum concentration observed in Q3 2022. A spike in concentration to above the DCC occurred in MW106R during Q3, however this was within historical range and decreased below the DCC in Q4.
- Concentrations of BTEXN and PAHs were reported below LORs at all groundwater monitoring locations during 2023, consistent with historical records.
- TRH (C10-C36) concentrations were below the DCC at all groundwater monitoring locations in 2023 with the exception of a spike exceedance at MW01R during Q2 that was above historical ranges. The spike exceedance is not indicative of any trend and TRH concentrations decreased below criteria during Q3 and <LOR during Q4.
- Thermotolerant coliform concentrations were similar to 2022, with the exception of some isolated spikes above the historical ranges and DCC at MW108R (December), MW109 (December) and MW308R (March). The concentration in MW307R during Q1 also exceeded the DCC. All other detections were below assessment criteria over 2023.

## 4.0 Compliance

### 4.1 Compliance Summary

As per section 3.2.2 of the Guidelines, the status of each compliance requirement applicable during the reporting period must be recorded by using the relevant descriptors in Table 9 below.

**Table 9 - Compliance Status Descriptors**

Status	Description
Compliant	The proponent has collected sufficient verifiable evidence to demonstrate that all elements of the requirement have been complied with.
Non-compliant	The proponent has identified a non-compliance with one or more elements of the requirement.
Not triggered	A requirement has an activation or timing trigger that has not been met at the phase of the development when the compliance assessment is undertaken, therefore an assessment of compliance is not relevant.

Compliance with Approval conditions for the reporting period 01 January 2023 – 31 December 2023 is summarised in Table 10 below and Appendix A.

**Table 10 - Compliance Summary**

Criteria	Status	Comments
Actions Audited	136	
Compliant	65	
Not Triggered	70	
Non-Compliant	1	Refer Appendix B and Section 4.2
Assigned Actions	4	Refer Section 2.4
Notifiable Incidents	0	
Community Complaints	0	

## 4.2 Non-Compliance

One non-compliance with the conditions of the Approval was identified during the audit period. The non-compliance register has been incorporated as Appendix B and includes actions to address non-compliance.

A non-compliance relating to the incomplete implementation of the surface and groundwater monitoring program, as required by Condition C19 of the Approval, was identified. Departures from the program have been detailed in Table 8 and Appendix B.

## 4.3 Previous Report Actions

Previous OCR actions are detailed in Table 11 below.

Table 11 - Previous Report Actions

OCR	Action	Status
2022	Engaged contractor continues to review that field probe is maintained. Where these unexpectedly fail lab results are available which are more accurate and relied upon for reporting	Complete
2022	Adopt Compliance Reporting Post Approval Requirements (Department of Planning, 2018).	Complete

## 4.4 Complaints

No complaints were received relating to the Site's environmental performance during the reporting period as per Table 12 below:

Table 12 - Complaints

ID	Stakeholder OCR ID	Complaint Date	Aurizon Response	Complaint Summary
NO COMPLAINTS RECEIVED DURING THE REPORTING PERIOD				

## 4.5 Notifiable Incidents

There were no reportable incidents during the reporting period.

## 4.6 Inspections and Audits

The following site inspections and audits were undertaken during the reporting period:

- Scheduled site inspections and internal audits as required under the OEMP;
- Periodic site inspections by the Principal Advisor Environment and site personnel; and

# APPENDICIES

## APPENDIX A - Compliance Register



Reporting Period Relevant MP07\_0171 MOD 1 Conditions Compliance Summary

Condition Number	Section	Condition/Compliance Requirement	Status	Completion Date
B1	Terms of Approval	<p>The Proponent shall carry out the SSI generally in accordance with the:</p> <p>(a) Application MP 07_0171;                      (b) Environmental Assessment, NSW Train Support Facility, Maitland Road, Hexham (ADW Johnson Pty Limited, November 2012);                      (c) Preferred Project Report and Response to Submissions, NSW Train Support Facility, Maitland Road, Hexham (JBA, June 2013);                      (d) State Significant Infrastructure – Modification: Detailed Environmental Assessment Report, Maitland Road, Hexham (Ethos Urban, June 2019);                      (e) State Significant Infrastructure MP07_0171 Modification: Response to Submissions (Ethos Urban, August 2019); and                      (f) Depot Relocation Modification Assessment Report (Ethos Urban, April 2022);                      (g) Hexham Long Term Train Stabling Facility Modification 2 (SSI-6090-Mod-2) – Response to Submissions Report                      (h) Hexham Long Term Train Stabling Facility Modification 2 (SSI-6090-Mod-2) – Revised Modification Plans</p>	Compliant	Ongoing
B2	Terms of Approval	<p>In the event of an inconsistency between:</p> <p>(a) the conditions of this approval and any document listed from condition B1(a) to B1(i) inclusive, the conditions of this approval shall prevail to the extent of the inconsistency;                      (b) any document listed from condition B1(a) to B1(i) inclusive, the most recent document shall prevail to the extent of the inconsistency.</p>	Not Triggered	
B3	Terms of Approval	<p>The Proponent shall comply with any reasonable requirement(s) of the Director General arising from the Department's assessment of:</p> <p>(a) any reports, plans or correspondence that are submitted in accordance with this approval; and                      (b) the implementation of any actions or measures contained within these reports, plans or correspondence.</p>	Compliant	Ongoing
B4	Terms of Approval	Subject to confidentiality, the Proponent shall make all documents required under this approval available for public inspection on request.	Not Triggered	Ongoing
B4(a)	Terms of Approval	The following Conditions of Approval do not apply to the Turning Angle Works: B5, C3, C16, C18, C22, C23, C33, C34, C35, C38, C39, E1, E5, E13, E14, E15, E16, E17, E24, E25, E26, E30, E32, E36, E42, E43, E44, E49, E59, E60, and F3.	Not Triggered	Ongoing
B4(b)	Terms of Approval	Any references to entities listed in column A are to be interpreted as entities in column B throughout the approval:	Not Triggered	
B5	Limits of Approval	This approval shall lapse 10 years after the date on which it is granted, unless works that are the subject of this SSI approval are physically commenced on or before that date.	Not Triggered	

Condition Number	Section	Condition/Compliance Requirement	Status	Completion Date
B6	Statutory Requirements	The Proponent shall ensure that all necessary licences, permits and approvals required for the development of the SSI are obtained and maintained as required throughout the life of the SSI. No condition of this approval removes the obligation for the Proponent to obtain, renew or comply with such necessary licences, permits or approvals.	Compliant	1/09/2022
B7	Statutory Requirements	Any changes to the scope of the SSI activity shall be subject to a consistency review. Should the review identify activity scope and environmental impacts inconsistent with the assessed SSI activity, a modification to the Infrastructure Approval will be required.	Compliant	30/05/2023
B8	Staging	The SSI may be constructed and operated in stages. Where staged construction or operation is proposed, a <b>Staging Report</b> (for either or both construction and operation as the case may be) must be prepared and submitted to the Planning Secretary no later than one month before the commencement of construction of the first of the proposed changes of construction (or if only staged operation is proposed, one month before the commencement of operation of the first of the proposed stages of operation).	Not triggered	N/A
B9	Staging	<p>The Staging Report must:</p> <p>(a) if staged construction is proposed, set out how the construction of the whole of the SSI will be staged, including details of work and other activities to be carried out in each stage and the general timing of when construction of each stage will commence and finish;</p> <p>(b) if staged operation is proposed, set out how the operation of the whole of the SSI will be staged, including details of work and other activities to be carried out in each stage and the general timing of when operation of each stage will commence and finish (if relevant);</p> <p>(c) specify how compliance with conditions will be achieved across and between each of the stages of the SSI; and</p> <p>(d) set out mechanisms for managing any cumulative impacts arising from the proposed staging.</p>	Not triggered	N/A
B10	Staging	The SSI must be staged in accordance with the Staging Report, as submitted to the Planning Secretary.	Not triggered	N/A
B10A	Staging	Where staging is proposed, the terms of this approval that apply or are relevant to the works or activities to be carried out in a specific stage must be complied with at the relevant time for that stage.	Not triggered	N/A
B11	Compliance	The Proponent shall ensure that employees, contractors and sub-contractors are aware of, and comply with, the conditions of this approval relevant to their respective activities.	Compliant	Ongoing
B12	Compliance	The Proponent shall be responsible for environmental impacts resulting from the actions of all persons that it invites onto the site, including contractors, sub-contractors and visitors.	Compliant	Ongoing

Condition Number	Section	Condition/Compliance Requirement	Status	Completion Date
B13	Compliance	In the event of a dispute between the Proponent and a public authority in relation to an applicable requirement in this approval or relevant matter relating to the SSI, either party may refer the matter to the Director-General for resolution. The Director General's determination of any such dispute shall be final and binding on the parties.	Not Triggered	Ongoing
C1	Operational Noise and Vibration	The SSI shall be designed and operated with the objective of not exceeding the vibration goals for human exposure for existing sensitive receivers, as presented in Assessing Vibration: a Technical Guideline (DECC, 2006).	Compliant	Ongoing
C2		The Proponent shall ensure that the SSI is designed and operated so as not to exceed the operational noise limits presented in Table 1 at the nominated receivers. Refer Table 1 for noise limits.	Compliant	Ongoing
C3	Ecological Monitoring	<p>C3. Prior to the commencement of construction work that would result in the disturbance of any native vegetation, threatened flora and fauna or endangered ecological communities (EECs) and their habitats, the Proponent shall develop an Ecological Monitoring Program to monitor the effectiveness of the biodiversity mitigation measures implemented as part of the SSI. The Program shall be developed by a suitably qualified and experienced ecologist in consultation with the OEH. The Program shall include, but not necessarily be limited to:</p> <p>(a) an adaptive monitoring program to assess the effectiveness of the mitigation measures identified in conditions E3, E4, E5, E7, E8, E9, E10, E11, E12 and E63 (b) and allow amendment to the measures if necessary;</p> <p>(b) monitoring and/or assessment measures for assessing changes in groundwater dependent ecosystems, including impact assessment criteria;</p> <p>(c) identification of appropriate and justified monitoring periods and performance targets against which effectiveness of the mitigation measures will be measured;</p> <p>(d) provision for the assessment of data to identify changes to habitat usage and groundwater dependent ecosystems and if this can be attributed to the SSI activity;</p> <p>(e) details of contingency measures that would be implemented in the event of any exceedence of water quality thresholds which would be injurious to biotic systems and/or species, or changes to the structure and composition of groundwater dependent ecosystems which are directly attributable to the construction or operation of the SSI activity;</p> <p>(f) monitoring protocols for the Hunter Wetland National Park;</p> <p>(g) monitoring protocols for Saltmarsh endangered ecological community and Freshwater Wetland ecological community;</p> <p>(h) monitoring protocols for habitat conditions that support the Green and Golden Bell Frog;</p>	Not Triggered	19/03/2019
C3 (continued)	Ecological Monitoring	<p>(i) mechanisms for developing additional monitoring protocols to assess the effectiveness of any additional mitigation measures implemented to address additional impacts in the case of design amendments or unexpected threatened species finds during construction (where these changes are generally consistent with the biodiversity impacts identified for the SSI in the documents listed under conditions B1 (a) and B1 (c) inclusive; and</p> <p>(j) provision for annual reporting of monitoring results to the Director-General and the OEH, or as otherwise agreed by the Director-General and the OEH.</p> <p>Monitoring shall be undertaken during construction (for construction-related impacts) and upon operation of the SSI (for operation/ongoing impacts) until such time as the effectiveness of mitigation measures can be demonstrated to have been achieved over a minimum of three successive monitoring periods after the commencement of operation, or as otherwise agreed by the Director-General.</p>	Not Triggered	19/03/2019

Condition Number	Section	Condition/Compliance Requirement	Status	Completion Date
C4	Biodiversity Offsets	<p>In the event that the extent, type or condition of native vegetation communities or flora and fauna habitat are to be lost or degraded as a result of the SSI varies to that described in the documents referred to in condition B1, or as otherwise agreed to by the Planning Secretary, the Proponent shall develop and submit a Biodiversity Offset Package for the approval of the Planning Secretary within 12 months of the commencement of construction. The Package shall detail how the ecological values lost as a result of the SSI will be offset. The Package shall be developed in consultation with the EESG and the Hunter LLS and shall include, but not necessarily be limited to:</p> <p>(a) the objectives and biodiversity outcomes to be achieved;</p> <p>(b) confirmation of the extent (in hectares), types and condition of the native vegetation communities (including SEPP 14 wetlands) and flora and fauna habitat to be lost or degraded as a result of the final design of the SSI, including consideration of the indirect impacts on adjacent retained vegetation and impacts caused through weed invasion, hydrological changes and potential edge effects;</p> <p>(c) a process for addressing and incorporating offset measures arising from changes in biodiversity impacts (where these changes are generally consistent with the biodiversity impacts identified for the SSI in the documents listed under condition B1 inclusive from –</p> <p>(i) changes to the footprint due to design changes,</p> <p>(ii) changes to predicted impacts as a result of changes to mitigation measures, and</p> <p>(iii) identification of additional species/specimens and/or habitat during pre- clearing surveys, construction or the establishment of ancillary facilities);</p> <p>(d) a statement of the methodology used to determine the offsets required;</p> <p>(e) details of the final suite of the biodiversity offset measures selected and secured with consideration of the Biodiversity Offset Strategy (as set out in Appendix G of the document referred to in condition B1 (c);</p> <p>(f) justification for the application of any Tier 2 and Tier 3 outcomes;</p> <p>(g) the final selected means of securing the biodiversity values of the offset package in perpetuity;</p>	Compliant	1/10/2016
C4 (continued)	Biodiversity Offsets	<p>(h) the management and monitoring requirements for compensatory habitat works (excluding biobanking sites) and other biodiversity offset measures proposed to ensure the outcomes of the Package are achieved including -</p> <p>(i) the monitoring of the condition of species and ecological communities at offset locations (excluding biobanking sites),</p> <p>(ii) the methodology for the monitoring program(s), including the number and location of offset monitoring sites and the sampling frequency at these sites, and</p> <p>(iii) provisions for annual reporting of the monitoring results for a specified period of time as determined in consultation with the EESG; and</p> <p>(i) timing and responsibilities for the implementation of the provisions of the Package.</p> <p>Land offsets shall be consistent with the Principles for the Use of Biodiversity Offsets in NSW and the Interim Policy on Assessing and Offsetting Biodiversity Impacts of Part 3A, State Significant Development (SSD) and State Significant Infrastructure (SSI) Projects (OEH, 2011). Any land offset shall be enduring and be secured by a conservation mechanism which protects and manages the land in perpetuity. Where land offsets cannot solely achieve compensation for the loss of affected biodiversity, additional measures shall be provided to collectively deliver a biodiversity offset in accordance with the Interim Policy on Assessing and Offsetting Biodiversity Impacts of Part 3A, State Significant Development (SSD) and State Significant Infrastructure (SSI) Projects (OEH, 2011) and to provide a positive biodiversity outcome for the region.</p> <p>Where possible, priority shall be given to securing offset sites as near to the location of the impact/loss as possible to assist with the preservation of the specific endemic community of the area and assure that the ecological and amenity benefits of retaining endemic vegetation remain within the locality. Should a conservation agreement under the National Parks and Wildlife Act 1974 not be considered a viable alternative, then the Proponent must ensure that any offset arrangement it enters into must provide a provision for in-perpetuity conservation title on the land and a monetary contribution sufficient to carry out rehabilitation and monitoring actions pursuant to this consent and any actions outlined under a Vegetation Management Plan. This may be the subject of a Planning Agreement within the meaning of section 93F of the Environmental Planning and Assessment Act 1979. Upon execution of the Planning Agreement, or other conservation mechanism to the satisfaction of the EESG, the Proponent shall inform the Secretary on the outcomes of such an agreement.</p> <p>Should updates to the Nest Box Plan be required in accordance with condition E7, updates shall be undertaken in consultation with EESG.</p>	Compliant	1/10/2016

Condition Number	Section	Condition/Compliance Requirement	Status	Completion Date
C5	Biodiversity Offsets	The Proponent shall ensure that groundwater dependent ecosystems outside the project footprint are not adversely affected by the design, construction and operation of the SSI.	Compliant	Ongoing
C6	Hydrology	Except as may be provided by an EPL, the SSI shall be constructed and operated to comply with section 120 of the Protection of the Environment Operations Act 1997 which prohibits the pollution of waters.	Compliant	Ongoing
C7	Stormwater Management	The SSI shall be designed, and employ surface water management techniques, such that runoff volumes, rates and pollutant loads are maintained as far as practicable to pre-construction levels and there are no adverse effects to adjoining lands as a result of runoff. The stormwater design shall be undertaken in consultation with the OEH and City of Newcastle and shall have consideration of the Newcastle Development Control Plan 2012.	Compliant	1/09/2022
C8	Stormwater Management	The SSI shall be designed and constructed to incorporate operational stormwater management measures, including (but not limited to): (a) areas of high sediment, areas of storage and use of oil and grease and areas containing nutrient loads (including the wash bays, provisioning sheds and servicing sheds) shall be separated from the general site stormwater system through the use of separate drainage systems, bunds and hardstands and subject to separate discharge to trade waste or re-use in the wash down bays; (b) where connection to the reticulated sewer system is identified to not be feasible, subject to justification based on further investigations, wastewater from the administration buildings, toilets, showers, lunch rooms, etc. shall be managed through a water treatment plant and be disposed via irrigation into existing agricultural pasture land. (c) site stormwater shall be directed into a drain on the western boundary of the SSI site and directed into one of three stormwater detention basins for treatment of suspended sediments and nutrients through floating wetlands, prior to its offsite discharge. This stormwater system shall be capable of treating at least a 1 % AEP stormwater event; and (d) access roads shall be provided with road side swales to provide treatment through flow attenuation and entrainment of suspended sediments.	Compliant	1/09/2022

Condition Number	Section	Condition/Compliance Requirement	Status	Completion Date
C9		<p>Prior to the commencement of construction, the Proponent shall, in consultation with the Water Group and EESG, prepare a Stormwater Management Plan and submit the plan for the approval for the Planning Secretary at least one month prior to the commencement of construction of the SSI. The Plan shall include but not necessarily be limited to:</p> <p>(a) final details of operational stormwater management measures to be implemented for the SSI based on detailed design, including identification of offsite discharge locations;</p> <p>(b) if required, identification of the water quality standards to which wastewater from the wastewater treatment plant would be treated to prior to its irrigation. The plan shall demonstrate that the water quality criteria to which the waste water would be treated to is suitable for irrigation purposes based on the land capability of the irrigation site (including nutrient loads, pH and salinity), considering existing baseline conditions and cumulative inputs from other irrigation sources to the site;</p> <p>(c) identification of the water quality standards to which stormwater from the three stormwater detention basins would be treated to prior to offsite discharge with consideration of the receiving environment and relevant water quality standards such as Managing Urban Stormwater: Environmental Targets (DECC &amp; CMA, October 2007); and</p> <p>(d) monitoring, review and maintenance procedures to assess and maintain the operational stormwater integrity and performance of the SSI consistent with the requirements of condition C19.</p> <p>Nothing in this condition precludes the Proponent from updating the Stormwater Management Plan presented in Appendix E (Stormwater Management Plan) or the document referred to in condition C19 to meet the requirements of this condition.</p> <p>Prior to construction of the Turning Angle Works, the Proponent must provide a copy of the revised plan including the Turning Angle Works to the Environmental Representative for approval. The ER may approve minor updates to the plan without further consultation with public authorities.</p>	Compliant	21/10/2022
C10	Groundwater	Excavation activities near the Hexham Swamp Nature Reserve shall be undertaken in a manner which prevents the drawdown of groundwater within the Nature Reserve to a level which results in desaturation of acid sulfate soils within the Nature Reserve.	Not Triggered	Ongoing
C11	Groundwater	All drainage structures, including but not limited to pits, pipes, cess drains, sediment basins and detention basins, shall be designed and constructed so as to minimise long term connection with groundwater. The stormwater system components, including but not limited to detention basins and floating wetlands, shall be designed and constructed to ensure that there is no permanent interception of, and/or connection with groundwater.	Compliant	1/02/2023
C12	Flooding	The SSI shall be designed and constructed so that it does not result in flooding impacts greater than those predicted in the documents referred to in condition B1. The cumulative impacts of the SSI and the proposed ARTC Hexham Relief Roads shall be considered in these requirements.	Compliant	18/03/2022
C13	Flooding	All buildings or structures below the 10% AEP level shall be constructed of flood compatible materials.	Compliant	18/03/2022
C14	Flooding	Electrical supply and signalling locations associated with the operation of the SSI shall be elevated above the 1 % AEP flood level and include a free board of 250 millimetres.	Compliant	28/02/2023

Condition Number	Section	Condition/Compliance Requirement	Status	Completion Date
C15	Flooding	<p>The Proponent shall prepare a Flood Emergency Management Plan which sets out the management requirements and procedures for managing flood risks during the construction and operation of the SSI, including flood recovery measures. The Plan shall be prepared in consultation with City of Newcastle and the EESG and be submitted to the Planning Secretary at least one month prior to the commencement of construction, or as otherwise agreed by the Planning Secretary.</p> <p>Prior to construction of the Turning Angle Works, the Proponent must provide a copy of the revised plan including the Turning Angle Works to the Environmental Representative for approval. The ER may approve minor updates to the plan without further consultation with public authorities.</p>	Compliant	23/03/2023
C16	Flooding	<p>Within 12 months of the commencement of construction, or as otherwise agreed by the Director-General, the Proponent shall consult with the landowner of Lot 100, DP 1044020, to develop feasible and reasonable measures for managing and/or mitigating flood impacts associated with the construction of the SSI to the residence located on the property. The Proponent shall forward a statement of agreed measures, including a timetable for implementation, to the Director-General within one month of reaching an agreement with the landowner. If there is a dispute regarding the proposed flood management measures, either party may refer the matter to the Director-General for resolution whose decision shall be final.</p>	Not Triggered	1/02/2017
C17	Watercourse Crossing	<p>All temporary and permanent watercourse crossings shall be designed in consultation with the NoW, and with the DPI (Aquaculture and Fisheries) where the crossing has the potential to impact on fish passage. Where feasible and reasonable, the crossings shall be consistent with the NoW's Guidelines for Controlled Activities and Policy and Guidelines for Fish Friendly Waterway Crossings (NSW Fisheries, 2004) and Policy for and Guidelines for Design and Construction of Bridges, Roads, Causeways, Culverts and Similar Structures (NSW Fisheries, 1999).</p>	Not Triggered	20/02/2014
C18	Watercourse Crossing	<p>The Proponent shall ensure that the upgrade of the Purgatory and Middle Creek crossings are designed to provide an equivalent hydraulic capacity to the existing culverts, not reduce the existing waterway area and to withstand heavy vehicle movements associated with the construction and operation of the SSI. The Proponent shall liaise with the City of Newcastle and the DPI in regards to the design and construction of the crossings.</p>	Not Triggered	20/02/2014

Condition Number	Section	Condition/Compliance Requirement	Status	Completion Date
C19	Surface and Groundwater Monitoring Program	<p>A Surface Water and Groundwater Monitoring Program shall be prepared and implemented to monitor impacts on surface water and groundwater quality and hydrology. The Program shall be developed in consultation with the EPA, the Water Group and Hunter LLS and shall include, but not necessarily be limited to:</p> <p>(a) identification of works and activities during construction of the SSI, including emergencies and spill events, that have the potential to impact on surface and groundwater water quality and groundwater depths and flows;</p> <p>(b) identification of surface and groundwater monitoring locations which are representative of the potential extent of impacts from the construction and operation of the SSI on water quality and groundwater depths and flows (including watercourses, waterbodies, wetlands, drainage swales and licensed discharge points);</p> <p>(c) a description of the parameters (including physico-chemical) and standards against which any changes to water quality will be monitored and assessed, having regard to the principles of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000 (ANZECC, 2000);</p> <p>(d) details of representative background monitoring of surface and groundwater quality parameters and groundwater depths and flows undertaken to date (or required to be undertaken) to establish baseline conditions;</p> <p>(e) identification of 'trigger points' for further investigation or action to be taken;</p> <p>(f) identification of the frequency and methodology of monitoring during background, construction and operation monitoring periods;</p> <p>(g) details on how the results of monitoring would be recorded;</p> <p>(h) details of how interactions with the ARTC Hexham Relief Roads Project and potential cumulative impacts would be monitored and managed;</p> <p>(i) contingency and ameliorative measures in the event that adverse impacts to surface waters and groundwater are identified consequent to the construction and/or operation of the SSI; and</p> <p>(j) methodology for reporting of the monitoring results to the Department and EPA.</p> <p>Monitoring shall be undertaken in accordance with the requirements of the approved Construction Soil and Water Management Plan required under Condition E63(d) and Operation Environment Management Plan required by condition F2.</p> <p>The Program shall be submitted to the Planning Secretary for approval at least one month prior to the commencement of construction of the SSI, or as otherwise agreed by the Planning Secretary.</p> <p>Prior to construction of the Turning Angle Works, the Proponent must provide a copy of the revised plan including the Turning Angle Works to the Environmental Representative for approval. The ER may approve minor updates to the plan without further consultation with public authorities.</p>	Non-Compliant	Ongoing
C20	Acid Sulphate Soils	The Proponent shall ensure that all acid sulfate soils and acid generating material excavated on site is disposed offsite in an appropriately licensed landfill facility, unless proposed to be re-used on site. Any acid sulphate soils or acid generating material to be re-used on site shall be temporarily stored and treated on site to required standards in an appropriately lined and bunded storage area located above the 1 % AEP flood level. Procedures for the treatment, temporary storage and monitoring of these materials shall be in accordance with the Acid Sulfate Soil Management Plan required to be prepared under condition E63 (d) (xi) of this approval.	Not Triggered	28/02/2023
C21	Acid Sulphate Soils	No acid sulfate soils or acid generating material shall be permanently stored on site, unless the material has been treated and validated as neutralised and the material is stored above the 1 % AEP flood level and protected by appropriate erosion and sediment control measures, and as agreed to by the EPA and the Director-General.	Not Triggered	28/02/2022
C22	Aboriginal Heritage	Prior to the commencement of construction the Proponent shall liaise with Registered Aboriginal Stakeholders on the conclusions and recommendations of the revised heritage assessments presented in Appendices J and K of the document referred to in condition B1 (c) of this approval, in relation to the sites identified as HS1 and HS2. Prior to the commencement of construction the Proponent shall submit evidence to the Director-General and OEH that the final mitigation approach for sites HS1 and HS2 (including opportunity for salvage or agreement that no further mitigation is required) has been determined in consultation with Registered Aboriginal Stakeholders.	Not Triggered	28/02/2022



Condition Number	Section	Condition/Compliance Requirement	Status	Completion Date
C23	Historic Heritage	<p>Prior to the commencement of pre-construction and construction activities in the vicinity of the junction of the Minmi to Hexham Railway and the Great Northern Railway, the Proponent shall prepare an Archaeological Assessment in accordance with the Heritage Council's Archaeological Assessments Guideline (1996). Should the assessment identify areas of potential archaeological resources, the Proponent shall further:</p> <p>(a) prepare a Historic archaeological investigation program using a methodology prepared in consultation with the OEH (Heritage Branch), and to the satisfaction of the Director-General. This work should be undertaken by an archaeological heritage consultant as agreed by the Heritage Branch and approved by the Director-General. The nomination for the Excavation Director shall demonstrate ability to comply with the Heritage Council's Criteria for the Assessment of Excavation Directors (July 2011);</p> <p>(b) report on the results of the Historic archaeological investigation program, including recommendations (such as for further archaeological work), in consultation with the Heritage Branch and to the satisfaction of the Director-General, and shall include, but not necessarily be limited to:</p> <p>(i) consideration of measures to avoid or minimise disturbance to archaeology, where archaeology of non-Aboriginal archaeological significance is found to be present, (ii) where impacts cannot be avoided, recommendations for any further investigations for archaeology of historical archaeological significance, and (iii) management and mitigation measures to ensure there are no additional impacts due to pre-construction and construction activities; and</p> <p>(c) undertake any further archaeological excavation works recommended by the results of the Historic archaeological investigation program.</p> <p>Within 12 months of completing the above work, unless otherwise agreed by the Director-General, the Proponent shall submit a report containing the findings of the excavations, including artefact analysis, and the identification of a final repository for finds, prepared in consultation with the Heritage Branch and to the satisfaction of the Director-General. A copy of the final report shall be submitted to the Heritage Council library.</p>	Not Triggered	14/01/2014 20/02/2014 20/02/2014 28/01/2015
C24	Hazards and Risks	<p>Dangerous goods, as defined by the Australian Dangerous Goods Code, shall be stored and handled strictly in accordance with:</p> <p>(a) all relevant Australian Standards;  (b) for liquids, a minimum bund volume requirement of 110% of the volume of the largest single stored volume within the bund; and  (c) the Environment Protection Manual for Authorised Officers: Bunding and Spill Management, technical bulletin (EPA, 1997).</p> <p>In the event of an inconsistency between the requirements listed from (a) to (c) above, the most stringent requirement shall prevail to the extent of the inconsistency.</p>	Compliant	Ongoing
C25	Waste Management	The Proponent shall ensure that all liquid and/or non-liquid waste generated on the site is assessed and classified in accordance with Waste Classification Guidelines (DECCW, 2009), or any future guideline that may supersede that document, and that it is appropriately handled.	Compliant	Ongoing
C26	Waste Management	The Proponent shall maximise the reuse and/or recycling of waste materials generated on site as far as practicable, to minimise the need for treatment or disposal of those materials off site.	Compliant	Ongoing
C27	Waste Management	The Proponent shall not cause, permit or allow any waste generated outside the site to be received at the site for storage, treatment, processing, reprocessing, or disposal on the site, except as expressly permitted by a licence under the Protection of the Environment Operations Act 1997, if such a licence is required in relation to that waste. This condition is independent of the operation of the Brancourts facility and Sewerage Treatment Plant.	Compliant	Ongoing
C28	Waste Management	All waste materials removed from the site shall be appropriately tracked and shall only be directed to a waste management facility or premises lawfully permitted to accept the materials.	Compliant	Ongoing

Condition Number	Section	Condition/Compliance Requirement	Status	Completion Date
C29	Utilities and Services	<p>Utilities, services and other infrastructure potentially affected by construction of the SSI shall be identified prior to commencement of that part of construction which affects the item, to determine requirements for access to, diversion, protection, and/or support.</p> <p>Consultation with the relevant owner and/or provider of services that are likely to be affected by the SSI shall be undertaken to make suitable arrangements for access to, diversion, protection, and/or support of the affected infrastructure as required. The Proponent shall ensure that disruption to any service is minimised and shall be responsible for advising impacted service recipients prior to any planned disruption of service. The cost of any such arrangements shall be borne by the Proponent, unless otherwise agreed with the utility/service provider.</p>	Not triggered	8/04/2022
C30	Utilities and Services	Utilities, services and other infrastructure owners to be consulted shall include, but not be limited to, the Hunter Water Corporation, Jemena, Ausgrid, Optus and Brancourts.	Not triggered	20/02/2014
C31	Property and Business Impacts	Subject to agreement with the relevant property owner, any damage caused to property or infrastructure as a result of the SSI shall be rectified or the property owner compensated, within a reasonable timeframe, with the costs borne by the Proponent. This condition is not intended to limit any claims that the property owner may have against the Proponent.	Not triggered	Ongoing
C32	Access	The Proponent shall not affect or alter any existing access routes currently in place between the OEH (NPWS) and landowners to the Hexham Swamp Nature Reserve, unless otherwise agreed to by the NPWS and landowners.	Not triggered	31/10/2015
C33	Access	The Proponent shall provide a new private access track (consistent with that described in the document referred to in condition B1 (c) to service properties located to the west and south of the SSI. The private access track shall utilise existing track footprints where practical.	Not triggered	31/10/2015
C34	Access	The SSI shall be designed so as not to preclude future pedestrian access across the site from the Hexham Railway Station to future industrial uses on the adjoining site.	Not triggered	1/09/2022
C35	Access	The SSI shall be designed and constructed with the objective of minimising adverse changes to existing access arrangements and services for other transport modes (including pedestrians and cyclists) and, where feasible and reasonable, facilitate an improved level of access and service to other transport modes comparable to the existing situation.	Compliant	28/02/2023
C36	Access	The SSI shall be designed to not preclude the location of identified future proposals, including the future Richmond Vale Rail Trail and the F3 Freeway to Raymond Terrace upgrade. In particular, any changes to the F3 Freeway to Raymond Terrace upgrade concept design, necessitated by the SSI, shall be at the Proponent's cost except where those changes are as a result of works outside of the F3 Freeway to Raymond Terrace footprint identified in B1.	Not triggered	1/09/2022
C37	Lighting	The Proponent shall ensure, where practicable, that all external lighting associated with the construction and operation of the SSI is mounted, screened and directed in such a manner so as not to create nuisance to residences. The lighting shall be the minimum level of illumination necessary and shall comply with the Australian Standard AS 4282:1997 - Control of the Obtrusive Effects of Outdoor Lighting and relevant Australian Standards in the series AS/NZ 1158 - Lighting for Roads and Public Spaces.	Compliant	1/07/2023

Condition Number	Section	Condition/Compliance Requirement	Status	Completion Date
C38	Landscapping	The Proponent shall undertake tree planting, where practicable, to screen views of the site from residences to the north and west of the site and from the viewpoints from the Pacific and New England Highways and the Hexham industrial/commercial area.	Not triggered	28/02/2022
C39	Community Contributions	The Proponent must ensure that any voluntary arrangement it enters into with the City of Newcastle, in relation to the provision of a monetary contribution or other material public benefit, which is to be applied to a public purpose, is the subject of a Planning Agreement within the meaning of section 93F of the EP&A Act. Upon execution of any Planning Agreement, the Proponent shall inform the Director-General on the outcomes of such an agreement.	Not triggered	18/01/2016
D1	Community Involvement	<p>The Proponent shall prepare and implement a Community Communication Strategy for the SSI. The Strategy shall be designed to provide mechanisms to facilitate communication between the Proponent (and its contractors), the Environmental Representative, City of Newcastle and the local community (broader and local stakeholders) on the detailed design, construction and environmental management of the SSI. The Strategy shall include, but not necessarily be limited to:</p> <p>(a) identification of stakeholders to be consulted as part of the Strategy, including affected and adjoining landowners;</p> <p>(b) procedures and mechanisms for the regular distribution of information to stakeholders on the progress of the SSI and matters associated with environmental management;</p> <p>(c) procedures and mechanisms through which stakeholders can discuss or provide feedback to the Proponent and/or Environmental Representative in relation to the environmental management and delivery of the SSI;</p> <p>(d) procedures and mechanisms through which the Proponent can respond to any enquires or feedback from stakeholders in relation to the environmental management and delivery of the SSI; and</p> <p>(e) procedures and mechanisms that would be implemented to resolve any issues/disputes that may arise between parties on the matters relating to the environmental management and delivery of the SSI. This may include the use of an appropriately qualified and experienced independent mediator.</p> <p>Key issues to be addressed in the Community Communication Strategy should include, but not necessarily be limited to:</p> <p>(a) traffic management (including construction access and construction vehicle management);</p> <p>(b) noise and vibration mitigation and management;</p> <p>(c) erosion, sedimentation and stormwater management;</p> <p>(d) surface and groundwater management;</p> <p>(e) air quality; and</p> <p>(f) construction scheduling and progress on construction activities.</p> <p>The Proponent shall maintain and implement the Strategy throughout construction of the SSI. The Strategy shall be submitted to the <b>Planning Secretary</b> for approval at least one month prior to the commencement of construction, or as otherwise agreed to by the <b>Planning Secretary</b>.</p> <p><b>Prior to construction of the Turning Angle Works, the Proponent must provide a copy of the revised plan including the Turning Angle Works to the Environmental Representative for approval. The ER may approve minor updates to the plan without further consultation with public authorities.</b></p>	Compliant	Ongoing
D2	Complaints and Enquiries Procedure	<p>Prior to the commencement of construction, the Proponent shall ensure that the following are available for community complaints and enquiries for the duration of construction:</p> <p>(a) a 24 hour telephone number(s) on which complaints and enquiries about the construction and operation of the SSI may be registered;</p> <p>(b) a postal address to which written complaints and enquiries may be sent;</p> <p>(c) an email address to which electronic complaints and enquiries may be transmitted; and</p> <p>(d) a mediation system for complaints unable to be re solved.</p> <p>The telephone number, the postal address and the email address shall be published in newspaper(s) circulating in the local area both prior to the commencement of construction and prior to the commencement of operation. The above details shall also be provided on the website (links or dedicated pages) required by this approval.</p> <p>Nothing in this condition precludes the Proponent from incorporating the requirements of this condition into, or utilising, an existing complaints and enquiries procedure administered by the Proponent, provided it is demonstrated to meet the requirements of this condition.</p>	Compliant	Ongoing

Condition Number	Section	Condition/Compliance Requirement	Status	Completion Date
D3	Complaints and Enquiries Procedure	<p>The Proponent must prepare and implement a Complaints Management System consistent with AS 4269 Complaints Handling prior to the commencement of construction activities and must maintain the System for the duration of construction and for up to 12 months following completion of construction of the SSI.</p> <p>Information on all complaints received, including the means by which they were addressed and whether resolution was reached and whether mediation was required or used, must be maintained by the Proponent and included in a complaints register. The information contained within the System must be made available to the Director General on request.</p> <p>Nothing in this condition precludes the Proponent from incorporating the requirements of this condition into, or utilising, an existing complaints management system administered by the Proponent, provided it is demonstrated to meet the requirements of this condition.</p>	Compliant	Existing
D4	Provision of Electronic Information	<p>A website providing information in relation to the SSI must be established before commencement of works and maintained for the duration of construction, and up-to-date information (excluding confidential commercial information) must be published before the relevant works commencing and maintained on the website or dedicated pages including:</p> <p>(a) information on the current implementation status of the SSI;  (b) a copy of the documents listed in Condition B1 of this approval, and any documentation relating to any modifications made to the SSI or the terms of this approval;  (c) a copy of this approval in its original form, a current consolidated copy of this approval (that is, including any approved modifications to its terms), and copies of any approval granted by the Minister to a modification of the terms of this approval;  (d) a copy of each statutory approval, licence or permit required and obtained in relation to the SSI;  (e) a current copy of each document required under the terms of this approval, which must be published before the commencement of any works to which they relate or before their implementation, as the case may be; and  (f) a copy of the compliance reports required under Condition D5 of this approval.</p> <p>Documents related to the construction of the project shall be maintained for a minimum of 24 months following the completion of construction of the Turning Angle Works. Documents related to the operation of the project must be maintained for the life of the project.</p>	Compliant	28/02/2023
D5	Compliance Tracking	No later than 4 weeks before the commencement of construction, a Compliance Monitoring and Reporting Program prepared in accordance with the Compliance Reporting Requirements (Department 2018) must be endorsed by the ER and submitted to the Department.	Not triggered	N/A
D5(a)	Compliance Tracking	Compliance reports of the SSI must be carried out in accordance with the Compliance Reporting Requirements (Department 2018). The Department must be notified of the commencement dates of construction and operation of the SSI in the pre-construction and pre-operational compliance reports.	Compliant	31/07/2023
D5(b)	Compliance Tracking	The construction compliance report must provide details of any review of, and minor amendments made to, the CEMP (which must be approved by the ER), resulting from construction carried out during the reporting period.	Compliant	31/07/2023
D5(c)	Compliance Tracking	The Proponent must make each compliance report publicly available and notify the Department in writing when this has been done.	Compliant	31/07/2023
D5(d)	Compliance Tracking	The Compliance Monitoring and Reporting Program in the form required under Condition A30 of this approval must be implemented for the duration of construction and for a minimum of one (1) year following commencement of operation, or for a longer period as determined by the Planning Secretary based on the outcomes of independent audits, Environmental Representative Reports and regular compliance reviews submitted through Compliance Reports. If staged operation is proposed, or operation is commenced of part of the SSI, the Compliance Monitoring and Reporting Program must be implemented for the relevant period of each stage or part of the SSI.	Compliant	Ongoing
D6	Incident Report	The Department must be notified in writing to <a href="mailto:compliance@planning.nsw.gov.au">compliance@planning.nsw.gov.au</a> immediately after the Proponent becomes aware of an incident. The notification must identify the SSI (including application number and the name of the SSI), and set out the location and nature of the incident.	Not triggered	Ongoing

Condition Number	Section	Condition/Compliance Requirement	Status	Completion Date
D7	Incident Report	The Proponent shall meet the requirements of the Director-General to address the cause or impact of any incident, as it relates to this approval, reported in accordance with condition D6, within such period as the Director-General may require.	Not triggered	Ongoing
E1	Clearing	The Proponent shall ensure that clearing of native vegetation and infilling of SEPP 14 Wetland No. 833 is limited to the minimal extent required for the construction and operation of the SSI, and no greater than 12 hectares (including SEPP 14 wetlands).	Not triggered	Ongoing
E2	Clearing	The Proponent shall implement all mitigation measures as identified in the Construction Flora and Fauna Management Plan (condition E63 (b)), to minimise the potential for damage to native vegetation (particularly threatened species and endangered ecological communities and their habitat) not proposed to be cleared as part of the SSI, to ensure that there is no incursion into, or clearing of the vegetation.	Compliant	01/07/2023
E3	Clearing	The Proponent shall mark areas of endangered ecological communities and threatened species habitat not to be impacted by the SSI with flagging tape or similar prior to commencing construction to ensure that there is no incursion into or clearing of the areas.	Not triggered	28/02/2023
E4	Clearing	Any areas temporarily disturbed during construction (including access tracks and compound sites) shall be rehabilitated to a standard equal to or better than the existing condition, as soon as feasible and reasonable following the completion of construction activities in the affected location. Replanting of affected vegetation shall be undertaken using locally occurring native species.	Compliant	01/07/2023
E5	Clearing	The Proponent shall ensure that any coarse woody debris removed from the site, including timber from felled trees (particularly hollow bearing timber), shall be relocated to the Northern Offset site as identified in Appendix G of the document referred to in condition B1 (c) of this approval, for the enhancement of the ecological values of that site.	Not triggered	28/02/2023
E6	Pre-clearing surveys	<p>Prior to construction, pre-clearing surveys and inspections for threatened flora and fauna species and habitat features (including hollow bearing trees) shall be undertaken. The surveys and inspections, and any subsequent relocation of species, shall be undertaken under the guidance of a suitably qualified and experienced ecologist. The methodology for pre-clearance surveys shall be incorporated into the Construction Flora and Fauna Management Plan (condition E63(b)).</p> <p>The Proponent is to undertake pre-clearing surveys prior to commencement of construction of the Turning Angle Works.</p>	Not triggered	N/A
E7	Pre-clearing surveys	Should pre-clearing surveys reveal the need to remove tree hollows to construct and/or operate the SSI, the Proponent shall consider the need for the preparation of a Nest Box Plan. If a Plan is required, it shall be included as part of the Biodiversity Offset Package required by condition C4 and detail the number and type of nest boxes to be installed, which shall be justified based on the number and type of hollows removed, the density of hollows in the area to be cleared and in adjacent areas, and the availability of adjacent food resources. The Plan shall also consider the relocation of any hollows removed from the site to provide for potential nesting habitat. The Plan shall also provide details of maintenance protocols for any nest boxes installed including responsibilities, timing and duration.	Not triggered	21/09/2021
E8	Litoria aurea (Green and Golden Bell Frog)	The Proponent shall prepare a management plan that identifies the strategies that would be implemented in the event that the Green and Golden Bell Frog is identified during construction. The plan shall be developed in consultation with the OEH and include details on the mitigation measures to be implemented to minimise the risk to this species, including direct and indirect impacts to its habitat. The plan is to be submitted to the Director-General at least one month prior to construction, unless otherwise agreed by the Director-General. Nothing in this condition precludes the inclusion of this plan in the Flora and Fauna Management Plan (condition E63 (b)).	Compliant	Ongoing

Condition Number	Section	Condition/Compliance Requirement	Status	Completion Date
E9	Litoria aurea (Green and Golden Bell Frog)	In the event that the Green and Golden Bell Frog is identified to occur during construction, all work in the vicinity of the sighting shall stop to the extent necessary to allow the procedures set out in the management plan (condition E8) to be implemented.	Not triggered	Ongoing
E10	Flora and Fauna Mitigation	In the event that other threatened fauna or flora species are identified during construction, all work in the vicinity of the sighting shall stop and management measures to minimise the risk to the species implemented in accordance with the procedure required by condition E63 (b)(iv).	Not triggered	Ongoing
E11	Flora and Fauna Mitigation	<p>The Proponent shall implement measures to minimise impacts to fauna species and their habitat as far as practicable (and where feasible and reasonable), during the construction of the SSI, including:</p> <p>(a) protocols for the removal and relocation of fauna during clearing, including a two- stage clearing strategy;</p> <p>(b) establishing "no go" zones, including at freshwater wetland and coastal saltmarsh sites outside of the construction zone;</p> <p>(c) provision of setbacks;</p> <p>(d) presence of a suitably qualified and experienced ecologist to oversee clearing activities and facilitate fauna rescues and relocation;</p> <p>(e) timing construction to be outside of the breeding season of threatened species with the potential to occur on the site;</p> <p>(f) maintaining and reinstating habitat features (such as large woody debris, bush rock, leaf litter/mulch and topsoil etc.);</p> <p>(g) developing measures for minimising the incidence of fauna being trapped in excavation cells (such as minimising the length of time that cells are left exposed) and measures to deal with trapped or injured fauna;</p> <p>(h) implementing drainage controls to prevent the extension of Gambusia holbrooki (Eastern Mosquitofish) into the Hexham Swamp Nature Reserve; and</p> <p>(i) progressive re-vegetation of areas temporarily disturbed by construction.</p> <p><b>The Proponent is to implement the specific flora and fauna mitigation measures prior to commencement of construction of the Turning Angle Works.</b></p>	Compliant	01/07/2023
E12	Flora and Fauna Mitigation	Where reasonable and feasible, all private access tracks and internal service roads are to be at least 50 metres from SEPP 14 wetlands and the Hexham Swamp Nature Reserve or as otherwise agreed by the <b>Planning Secretary</b> , or as specified at an alternative distance in the documents listed under conditions B1 (c) of this approval.	Not triggered	1/09/2022
E13	Aboriginal Heritage	During detailed design and construction of the SSI, impacts to Aboriginal objects shall, where feasible and reasonable, be avoided and minimised, under the guidance of an appropriately qualified archaeological heritage consultant. Where impacts are unavoidable, works shall be undertaken in accordance with the strategy outlined in the Construction Heritage Management Plan (condition E63(e)).	Compliant	01/07/2023
E14	Aboriginal Heritage	Prior to the commencement of pre-construction and/or construction activities, the Proponent shall provide registered Aboriginal stakeholders with the opportunity to collect the shell material located in fill material near the southern end of the proposed SSI and for the material to be lodged in a keeping place in accordance with condition E63 (e)(i)V.	Not triggered	27/02/2014
E15	Aboriginal Heritage	Prior to the commencement of pre-construction and/or construction activities that will impact on HS1 and HS2, the Proponent shall provide for an appropriately qualified archaeological heritage consultant and registered Aboriginal stakeholders to record and collect any surface artefacts which would be affected by the construction of the SSI. The artefacts shall be lodged in a keeping place as identified under condition E63 (e)(i)V.	Not triggered	27/02/2014
E16	Aboriginal Heritage	The Proponent shall erect a protection zone around the rise of land near to Woodlands Close to prevent incursion into the HS1 area during the pre-construction and construction phases of the SSI. The area to be protected shall be delineated in consultation with the registered Aboriginal stakeholders and an appropriately qualified archaeological heritage consultant.	Not triggered	27/02/2014

Condition Number	Section	Condition/Compliance Requirement	Status	Completion Date
E17	Historic Heritage	The Proponent shall prepare an Interpretation Plan to ensure that the proposed plaque and salvaged building materials are used appropriately and placed in appropriate locations to ensure that the sites users are able to understand and appreciate the sites history and heritage. The Interpretation Plan will be prepared by an appropriately qualified interpretation specialist and will be submitted to the Heritage Council for review prior to the installation of these interpretive features.	Not triggered	6/03/2014
E18	Construction Hours	Construction activities (including the delivery of materials) associated with the SSI shall be undertaken during the following standard construction hours: (a) 7:00 am to 6:00 pm Mondays to Fridays, inclusive; and (b) 8:00 am to 1 :00 pm Saturdays; (c) at no time on Sundays or public holidays.	Compliant	01/07/2023
E19	Construction Hours	Construction activities (including the delivery of materials) outside of the prescribed construction hours identified in condition E 18 may be undertaken in the following circumstances:  (a) construction works where the cumulative air-borne noise generated is: (i) no more than 5 dB(A) above the rating background level at any residence in accordance with the Interim Construction Noise Guideline (DECC, 2009); and (ii) no more than the noise management levels specified in Table 3 of the Interim Construction Noise Guideline (DECC, 2009) at other sensitive receivers; (b) where a negotiated agreement has been reached with affected receivers as the prescribed noise and vibration levels cannot be achieved; (c) for the delivery of materials required outside these hours by the NSW Police Force, RMS or other authorities for safety reasons; (d) where it is required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm; or (e) works approved through an EPL (including rail possessions) and in accordance with an out-of-hours works procedure.	Not triggered	28/02/2023
E20	Construction Hours	Except as expressly permitted by an EPL, high noise impact activities and works resulting in impulsive or tonal noise emissions (such as rock braking, rock hammering and pile driving) shall only be undertaken:  (a) between the hours of 8:00 am to 5:00 pm Monday to Friday; (b) between the hours of 8:00 am to 1 :00 pm Saturday; and (c) in continuous blocks not exceeding three hours each with a minimum respite from those activities and works of not less than one hour between each block.  For the purposes of this condition 'continuous' includes any period during which there is less than a one hour respite between ceasing and recommencing any of the work which is the subject of this condition.	Not triggered	28/02/2023
E21	Construction Noise and Vibration	The Proponent shall implement all reasonable and feasible noise mitigation measures with the aim of achieving the construction noise management levels detailed in the Interim Construction Noise Guideline (DECC, 2009). Any activities that could exceed the construction noise management levels shall be identified and managed in accordance with the Construction Noise and Vibration Management Plan required under condition E63 (c) of this approval.	Compliant	01/07/2023
E22	Construction Noise and Vibration	The SSI shall be constructed with the aim of achieving the following construction vibration goals and ground-borne noise levels:  (a) for structural damage vibration, the vibration limits set out in the German Standard DIN 4150 Part 3-1999 Structural Vibration in Buildings - Effects on Structures; (b) for human exposure, the acceptable vibration values set out in the Environmental Noise Management Assessing Vibration: A Technical Guideline (DEC, 2006) ; and (c) the ground-borne noise levels set out in the Interim Construction Noise Guideline (DECC, 2009).	Compliant	Ongoing
E23	Construction Noise and Vibration	Wherever feasible and reasonable, piling activities shall be undertaken using quieter alternative methods than impact or percussion piling, such as bored piles or vibrated piles.	Not triggered	

Condition Number	Section	Condition/Compliance Requirement	Status	Completion Date
E24	Construction Noise and Vibration	The Proponent shall identify and consult with potentially-affected community, religious, educational institutions and vibration-sensitive businesses and critical working areas, including the Church on Old Maitland Road, Hexham, and where feasible and reasonable ensure that noise generating construction works in the vicinity of the receivers are not timetabled during sensitive periods, unless appropriate other arrangements are made.	Not triggered	31/10/2015
E25	Construction Noise and Vibration	During construction, Proponents of other construction works in the vicinity of the SSI shall be consulted, and feasible and reasonable steps taken to coordinate works to minimise impacts on, and maximise respite for, affected sensitive receivers.	Not triggered	5/08/2014
E26	Construction Noise and Vibration	<p>The Proponent shall prepare and implement a management plan for each rail possession where construction works are being undertaken. The Plan shall include, but not be limited to:</p> <p>(a) a description of the works to be undertaken during the rail possession;</p> <p>(b) justification for the works to be undertaken during the possession, including reasons as to why the works are unable to be undertaken during standard construction hours;</p> <p>(c) timing and duration of the possession;</p> <p>(d) an out-of-hours work (OOHW) protocol for the assessment, management and approval of works outside of standard construction hours as defined in condition E18 including a risk assessment process under which an Environmental Representative may approve out-of-hour construction activities deemed to be of low environmental risk and refer high risk works for the Director-General's approval. The OOHW protocol shall detail standard assessment, mitigation and notification requirements for high and low risk out-of-hour works, and detail a standard protocol for referring applications to the Director-General;</p> <p>(e) a construction noise impact statement detailing the predicted noise levels, and specific management measures in relation to properties where noise levels are predicted to exceed the noise criteria in the Interim Construction Noise Guidelines (DECC, 2009); and</p> <p>(f) a consultation and notification process for affected sensitive receivers.</p> <p>The Plan shall be submitted to the Director-General at least one month prior to the rail possession, unless otherwise agreed by the Director-General.</p> <p>Works undertaken during a rail possession shall be limited to those necessary to facilitate critical work on or in the immediate vicinity of the rail line which cannot otherwise be undertaken due to safety issues and/or track reliability.</p>	Not triggered	31/10/2015
E27	Sediment and Erosion	Fluvial geomorphology, soil and water management measures consistent with the recommended mitigation measures in Appendix E of the document referred to in condition B1 (c) and the measures in Managing Urban Stormwater - Soils and Construction Volumes 1 and 2, 4th Edition (Landcom, 2006) shall be employed prior to and during the construction of the SSI (including prior to clearing) to minimise soil erosion and the discharge of sediment and other pollutants to land and/or waters.	Compliant	17/02/2023
E28	Sediment and Erosion	Facilities shall be provided (including at all exit points leading onto public roads) to minimise tracking mud, dirt or other material onto a public road or footpath. In the event of any spillage, the Proponent shall remove the spilled material as soon as practicable within the working day of the spillage.	Compliant	13/03/2020
E29	Sediment and Erosion	Where reasonable and feasible, the Proponent shall undertake the upgrade of waterway crossing during periods of dry weather.	Not triggered	6/07/2020



Condition Number	Section	Condition/Compliance Requirement	Status	Completion Date
E30	Contamination	Prior to the commencement of construction the Proponent shall undertake further investigations as recommended in the Remediation Action Plan included in Appendix H of the document referred to in condition B1 (c), to confirm the presence of contaminants on site, based on detailed design requirements. Upon confirmation of the contaminated areas on site, the Proponent shall update the Remediation Action Plan as required to take into account any new or updated procedures relevant to any new areas of contamination identified and remediate the identified sites in accordance with the updated Remediation Action Plan, prior the commencement of construction in the impacted areas.	Not triggered	11/09/2014
E31	Contamination	Where unexpected contaminated materials are identified during construction works, these materials would be identified, managed, treated and disposed of in accordance with the procedures outlined in the updated <b>Site Management Plan</b> . Where required, the Proponent shall engage a suitably qualified contaminated land consultant to prepare an addendum to the Validation Report referred to in condition E33 to cover the additional areas of contamination identified and additional remediation measures undertaken. The Proponent shall also engage an accredited NSW Site Auditor to prepare an updated Site Audit Report to assess the addendum Validation Report and submit a copy of both reports to the <b>Planning Secretary</b> and City of Newcastle.	Not triggered	Ongoing
E32	Contamination	Prior to the reuse of ballast, chitter or tailings within the existing railway corridor, the Proponent shall undertake sampling and testing of the materials to establish whether:  (a) the materials are of a quality suitable for the intended reuse; and  (b) the removal and reuse of the materials would not result in contaminated runoff.  Materials that are not suitable for reuse are to be classified in accordance with the Waste Classification Guidelines (DECCW, 2009) or any superseding document.	Not triggered	Ongoing
E33	Contamination	The Proponent shall engage a suitably qualified contaminated land consultant to prepare a Validation Report upon completion of the remediation of the areas identified in the Remediation Action Plan. The Validation Report shall verify that the site has been remediated in accordance with the Remediation Action Plan (if and as amended) and to a standard consistent with the intended land use. The Proponent shall engage an accredited NSW Site Auditor to prepare a Site Audit Report to determine the appropriateness of the Validation Report. The Validation Report and Site Audit Report shall be submitted to the <b>Planning Secretary within six months of completion of remediation works</b> . A copy of the reports shall also be submitted to the City of Newcastle for its information.	Not triggered	Ongoing
E34	Riparian and Aquatic Ecology	Impacts to riparian areas shall be minimised to the greatest extent practicable. Riparian vegetation in and around watercourses affected by the construction of the SSI shall be restored and rehabilitated in consultation with NoW and DPI (Aquaculture and Fisheries). Restoration and rehabilitation measures, including timeframes and reporting on completion of works, shall be included in the Construction Flora and Fauna Management Plan as required by (condition E63 (b)).	Not triggered	Ongoing
E35	Riparian and Aquatic Ecology	Construction activities undertaken in and around watercourses (including creek crossings) shall be consistent with the relevant NoW's Guidelines for Controlled Activities, including, but not limited to, 'In-stream Works', 'Outlet Structures', 'Riparian Corridors', 'Vegetation Management Plans', and 'Watercourse Crossings', or any guidelines which supersede these documents.	Not triggered	Ongoing
E36	Riparian and Aquatic Ecology	The Proponent shall schedule earthworks and any works on hydraulic controls to ensure that connection between the Hunter River and Hexham Swamp floodplain is retained throughout construction.	Not triggered	31/10/2015
E37	Flooding	The Proponent shall ensure that all fuels, dangerous goods and hazardous substances used in the construction of the SSI are stored in bunded locations above the 1 % AEP flood level, unless otherwise agreed by the Director-General.	Compliant	Ongoing

Condition Number	Section	Condition/Compliance Requirement	Status	Completion Date
E38	Flooding	The Proponent shall ensure that all areas used for the storage and treatment of acid sulfate soils during construction of the SSI are located or elevated above the 1 % AEP flood level, unless otherwise agreed by the Director-General.	Not triggered	28/02/2023
E39	Groundwater	Changes to hydrogeology, including groundwater depths, interception and connection with surface water, shall be minimised to the greatest extent practicable.	Compliant	Ongoing
E40	Groundwater	Dewatered groundwater shall not be discharged from the construction site or applied on site unless in accordance with an EPL.	Compliant	01/07/2023
E41	Road Dilapidation	<p>The Proponent shall engage an independent and qualified person(s) to prepare Road Dilapidation Reports for the Tarro Interchange prior to their use by construction heavy vehicles. The report shall assess the current condition of the road and describe mechanisms to restore any damage that may result due to traffic and transport related to the construction of the SSI. The Report shall be submitted to the relevant road authority(ies) for review prior to use of the roads for construction.</p> <p>Following completion of construction, a subsequent report shall be prepared to assess any damage caused by the construction of the SSI.</p> <p>The Proponent shall ensure that any measures to restore or reinstate roads affected by the construction of the SSI are undertaken in a timely manner, in accordance with the requirements, and to the satisfaction, of the relevant road authority(ies), and at the full expense of the Proponent.</p> <p>Any pavement failures arising from construction traffic that result in safety concerns for other road users, shall be repaired in accordance with the relevant road authority's specifications no later than 48 hours following notification by the relevant road authority.</p> <p><b>The Proponent must ensure that Road Dilapidation Reports are prepared prior to commencement of construction of the Turning Angle Works.</b></p>	Compliant	24/08/2023
E42	Construction Access	The Proponent shall construct, in the event it is responsible, a new T-intersection on Anderson Drive (Tarro Interchange) on the southern side of the New England Highway, in accordance with the requirements of the RMS, including entering into a Works Authorisation Deed with the RMS. The T-intersection at the Tarro Interchange shall be linked to Woodlands Close via a construction access road as detailed in the document referred to in condition B1 (c).	Not triggered	1/08/2014
E43	Construction Access	The Proponent shall design, in the event it is responsible, the T-intersection and construction access road and all associated traffic control signals and other structures in accordance with current AustRoads Standards and to the satisfaction of the relevant road authority(ies), and ensure that it is capable of accommodating the proposed construction traffic generated by the SSI and proposed ARTC Hexham Relief Roads project.	Not triggered	1/08/2014
E44	Construction Access	The Proponent shall, in the event it is responsible, seal the construction access road prior to commencement of use by construction traffic to provide all weather access.	Not triggered	1/08/2014
E45	Construction Access	Construction traffic shall not be permitted to access the SSI site via the New England Highway/Woodlands Close intersection at any time or unless otherwise approved by RMS.	Compliant	01/07/2023
E46	Construction Access	Construction heavy vehicle traffic shall not utilise Anderson Drive between Woodberry Drive and its intersection with the New England Highway near Glenwood Drive, Tarro, unless otherwise approved under the Construction Traffic and Access Management Plan required by condition E63 (a).	Compliant	01/07/2023

Condition Number	Section	Condition/Compliance Requirement	Status	Completion Date
E47	Construction Access	Condition deleted.	Not triggered	
E48	Construction Access	During construction of the SSI, the Proponent shall take all feasible and reasonable measures to minimise impacts on intersection performance and maintain the existing levels of service. Where modifications to intersections are required to maintain intersection performance, the Proponent shall obtain the necessary approvals from the relevant road authority.	Compliant	01/07/2023
E49	Construction Access	All construction works associated with the T-intersection on Anderson Drive (Tarro Interchange), Woodlands Close and the construction access road must be at no cost to the relevant road authorities, and to the satisfaction of the relevant road authorities.	Not triggered	31/10/2015
E50	Construction Access	The Proponent shall ensure as far as practicable that construction heavy and oversized vehicles associated with the construction of the SSI adhere to nominated haulage routes identified in the Construction Traffic and Access Management Plan (condition E63 (a)).	Compliant	Ongoing
E51	Construction Access	The Proponent shall ensure as far as practicable that all construction vehicles using public roads are maintained to prevent any loss of load, whether dust, liquid or soils.	Compliant	Ongoing
E52	Construction Access	Safe pedestrian and cyclist access through or around worksites shall be maintained during construction. In circumstances where pedestrian and cyclist access is restricted due to construction related activities, a feasible and reasonable alternate route shall be provided and signposted.	Compliant	Ongoing
E53	Private Property Access and Infrastructure	Access to private property shall be maintained during construction, unless otherwise agreed with the property owner in advance. Where access to a property is to be affected by construction of the SSI, the Proponent shall provide an alternative access of a standard that is at least equivalent to that currently existing and meets relevant road safety standards, prior to commencement of construction, unless otherwise agreed with the property owner. Details for provision of altered access shall be determined in consultation with the landholder.	Compliant	Ongoing
E54	Private Property Access and Infrastructure	Subject to agreement with the relevant landowner, a landowner's access that is physically affected by the SSI shall be reinstated to at least an equivalent standard upon completion of construction of the SSI, in consultation with the property owner.	Compliant	Ongoing
E55	Air Quality	The Proponent shall construct the SSI in a manner that minimises, as far as practicable, dust emissions from the site, including wind-blown and traffic-generated dust, dust from stockpiles, and dust from the tracking of materials from the construction site onto public roads.	Compliant	Ongoing

Condition Number	Section	Condition/Compliance Requirement	Status	Completion Date
E56	Air Quality	Should such visible dust emissions occur at any time, the Proponent shall identify and implement all feasible and reasonable dust mitigation measures (including temporary cessation of relevant works) such that emissions of visible dust cease.	Compliant	Ongoing
E57	Air Quality	The Proponent shall ensure that plant and equipment used in connection with the construction of the SSI is maintained and operated in a proper and efficient condition to minimise air quality impacts.	Compliant	6/07/2020
E58	Visual Amenity	The SSI shall be constructed in a manner that minimises, as far as practicable, visual impacts resulting from construction sites, including retaining existing vegetation around the perimeter of construction sites, where feasible and reasonable, providing temporary landscaping or screening, and minimising light spillage.	Compliant	28/02/2023
E59	Ancillary Facilities	<p>Unless otherwise approved by the Director-General, Ancillary Facilities shall:</p> <ul style="list-style-type: none"> <li>(a) be located more than 50 metres from a waterway, SEPP 14 wetland or the Hexham Swamp Nature Reserve;</li> <li>(b) be located within or in close proximity to the construction footprint for the SSI;</li> <li>(c) be sited on relatively level land;</li> <li>(d) be separated from nearest residences by at least 200 metres (or at least 300 metres for a temporary batching plant);</li> <li>(e) not require native vegetation clearing beyond that already required by the SSI;</li> <li>(f) not impact on known heritage items (including areas of archaeological sensitivity) beyond those already impacted by the SSI;</li> <li>(g) not unreasonably affect the land use of adjacent properties;</li> <li>(h) be above the 10% AEP flood level unless a contingency plan to manage flooding is prepared and implemented; and</li> <li>(i) provide sufficient area for the storage of raw materials to minimise, to the greatest extent practical, the number of deliveries required outside standard construction hours.</li> </ul> <p>The location of the ancillary facilities shall be identified in the Construction Environmental Management Plan (condition E62) and include consideration of the above criteria. Where the above criteria cannot be met for any proposed ancillary facility, the Proponent shall demonstrate to the satisfaction of the Director-General that there will be no significant adverse impact from that facility's construction. Such assessment(s) can be submitted separately or as part of the Construction Environmental Management Plan.</p> <p>The Director-General's approval is not required for the construction site compounds already identified in the document referred to in condition B1 (c) of this approval</p>	Compliant	20/02/2014 13/06/2014
E60	Ancillary Facilities	All Ancillary Facilities shall be rehabilitated to at least their pre-construction condition, unless otherwise agreed by the landowner where relevant.	Not triggered	Ongoing

Condition Number	Section	Condition/Compliance Requirement	Status	Completion Date
E61	Environmental Representative	<p>Prior to the commencement of construction of the SSI, or as otherwise agreed by the <b>Planning Secretary</b>, the Proponent shall nominate for the approval of the <b>Planning Secretary</b> a suitably qualified and experienced Environment Representative(s) that is independent of the design (including preparation of documentation referred to condition B1), and construction personnel. The Proponent shall employ the Environmental Representative(s) for the duration of construction, or as otherwise agreed by the <b>Planning Secretary</b>. The Environment Representative(s) shall:</p> <ul style="list-style-type: none"> <li>(a) be the principal point of advice in relation to the environmental performance of the SSI;</li> <li>(b) monitor the implementation and outcome of all environmental management plans and monitoring programs required under this approval and advise the Proponent upon the achievement of these plans and programs;</li> <li>(c) have responsibility for considering and advising the Proponent on matters specified in the conditions of this approval, and all other licences and approvals related to the environmental performance and impacts of the SSI;</li> <li>(d) ensure that environmental auditing is undertaken in accordance with the requirements of condition <b>D5(a)</b> of this approval and the Proponent's Environmental Management System(s);</li> <li>(e) be given the authority to approve/reject minor amendments to the Construction Environment Management Plan. What constitutes a "minor" amendment shall be clearly explained in the Construction Environment Management Plan required under condition E62;</li> <li>(f) be given the authority and independence to require reasonable steps be taken to avoid or minimise unintended or adverse environmental impacts, and failing the effectiveness of such steps, to direct that relevant actions be ceased immediately should an adverse impact on the environment be likely to occur; and</li> <li>(g) be consulted in responding to the community concerning the environmental performance of the SSI where the resolution of points of conflict between the Proponent and the community is required.</li> </ul> <p>The Environmental Representative must be retained for the duration of the construction of the Turning Angle Works. If the Environmental Representative previously engaged by this condition has been discharged from the SSI, a new Environmental Representative must be nominated to and approved by the Planning Secretary.</p>	Compliant	14/10/2022

Condition Number	Section	Condition/Compliance Requirement	Status	Completion Date
E62	CEMP	<p>Prior to the commencement of construction, the Proponent shall prepare and (following approval) implement a Construction Environmental Management Plan for the SSI. The Plan shall be prepared in accordance with the Guideline for the Preparation of Environmental Management Plans (DIPNR, 2004) and outline the environmental management practices and procedures to be followed during construction, and shall include, but not necessarily be limited to:</p> <ul style="list-style-type: none"> <li>(a) a description of all relevant activities to be undertaken during construction of the SSI, including scheduling;</li> <li>(b) statutory and other obligations that the Proponent is required to fulfil during construction including all approvals, consultations and agreements required from authorities and other stakeholders, and key legislation and policies. Evidence of consultation with relevant public authorities shall be included;</li> <li>(c) a description of the roles and responsibilities for all relevant employees involved in the construction of the SSI, including relevant training and induction provisions for ensuring that all employees, including contractors and sub-contractors are aware of their environmental and compliance obligations under these conditions of approval;</li> <li>(d) identification of ancillary facility site locations, including an assessment against the location criteria outlined in condition E59;</li> <li>(e) an environmental risk analysis to identify the key environmental performance issues associated with the construction phase and details of how environmental performance would be monitored and managed to meet acceptable outcomes including the actions to be undertaken to address identified potential adverse environmental impacts. In particular, the following environmental performance issues shall be addressed in the Plan: <ul style="list-style-type: none"> <li>(i) measures to monitor and manage dust emissions including dust generated by haulage trucks, traffic on unsealed internal access roads and stockpile management,</li> <li>(ii) measures to monitor and manage waste (solid and liquid) generated during construction including, but not necessarily limited to, identification of potential waste streams, general procedures for waste classification, waste management and mitigation measures, use of secondary waste material in construction wherever feasible and reasonable, and procedures for dealing with green waste,</li> <li>(iii) measures to monitor and manage spoil and fill including earthworks volumes, details of how spoil and fill would be handled, stockpiled, classified, used and disposed of, and a stockpile management protocol detailing location criteria that would guide the placement of stockpiles and minimum management measures (including rehabilitation) that would be implemented to avoid and/or minimise amenity impacts to surrounding residents and environmental risks (including to surrounding watercourses and wetlands), and</li> </ul> </li> <li>(iv) measures to monitor and manage hazard and risks including emergency management;</li> <li>(f) measures for rehabilitating construction disturbance areas that are not required for ongoing operations including construction compounds;</li> <li>(g) details of community complaints handling procedures and community involvement strategies during construction, consistent with the requirements of conditions D1 and D2 of this approval,</li> <li>(h) details of compliance and incident management and reporting consistent with the requirements of conditions D5, D6 and D7;</li> <li>(i) procedures for the periodic review and update of the Construction Environmental Management Plan as necessary (including where minor changes can be approved by the Environmental Representative); and</li> <li>(j) the additional Plans listed under condition E63.</li> </ul> <p>The Plan shall be submitted for the approval of the <b>Planning Secretary</b> at least one month prior to the commencement of construction, or within such period otherwise agreed by the <b>Planning Secretary</b>. Construction works shall not commence until written approval has been received from the <b>Planning Secretary</b>.</p> <p><b>Prior to construction of the Turning Angle Works, the Proponent must provide a copy of the revised plan including the Turning Angle Works to the Environmental Representative for approval.</b></p> <p>Note: The approval of a Construction Environmental Management Plan does not relieve the Proponent of any requirement associated with this infrastructure approval. If there is an inconsistency with an approved Construction Environmental Management Plan and the conditions of this infrastructure approval, the requirements of this infrastructure approval prevail.</p>	Compliant	21/10/2022

Condition Number	Section	Condition/Compliance Requirement	Status	Completion Date
E63	CEMP	<p>As part of the Construction Environment Management Plan for the SSI required under condition E62 of this approval, the Proponent shall prepare and implement the plans listed at (a) to (f) below. Where a plan is required to be prepared in consultation with an authority or stakeholders, the plan shall provide details on the consultation undertaken including any comments received and where these have been addressed in the plan.</p> <p>(a) A Construction Traffic and Access Management Plan to manage construction traffic and access impacts of the SSI and minimise disruptions to local traffic movements. The Plan shall be developed in consultation with the relevant road authority(ies) and include, but not necessarily be limited to:</p> <ul style="list-style-type: none"> <li>(i) identification of construction traffic and haulage routes and quantification of projected construction traffic volumes (including light, heavy and over- dimensional/ over mass sized vehicle movements, and spoil haulage), including any necessary route or timing restrictions on oversized loads. Construction traffic volumes and haulage routes should be detailed for the proposed T-intersection at the Tarro Interchange and New England Highway/Woodlands Close;</li> <li>(ii) details of the construction program for the T-intersection at the Tarro Interchange and construction access road connecting the intersection to Woodlands Close;</li> <li>(iii) a description of the site access arrangements for light, heavy and over-sized vehicles prior to and upon completion of the T-intersection at the Tarro Interchange and construction access road connecting the intersection to Woodlands Close;</li> <li>(iv) a Vehicle Movement Plan and Traffic Control Plans;</li> <li>(v) a protocol for minimising the cumulative construction traffic impacts of the SSI and proposed ARTC Hexham Relief Roads project, prepared in consultation with ARTC;</li> <li>(vi) methods for advising motorists of construction activities at the T-intersection on Anderson Drive (Tarro Interchange);</li> <li>(vii) details of the traffic management measures and key warning signage to be installed at the T-intersection on Anderson Drive (Tarro Interchange);</li> <li>(viii) construction staff parking requirements and the location(s) of proposed parking facilities;</li> <li>(ix) details of all temporary road closures and detours and measures to minimise impacts on local traffic;</li> <li>(x) a description of any proposed changes to pedestrian access at Woodlands Close, including measures to minimise impacts on pedestrian access;</li> <li>(xi) a driver code of conduct; and</li> <li>(xii) mechanisms for the monitoring, review and amendment of this plan.</li> </ul>	Compliant	21/10/2022
E63 (continued)	CEMP	<p>(b) A Construction Flora and Fauna Management Plan to detail how construction impacts on ecology will be minimised, managed and monitored. The Plan shall be developed in consultation with the <b>EESG</b> and <b>the Water Group</b> and shall include, but not necessarily be limited to:</p> <ul style="list-style-type: none"> <li>(i) details of pre-construction surveys required to verify the construction boundaries/footprint of the SSI based on detailed design and to confirm the vegetation to be cleared as part of the SSI (including threatened flora and fauna species, endangered ecological communities, riparian vegetation and tree hollows);</li> <li>(ii) details on the location (including plans) of all native vegetation communities, threatened flora and fauna species and their habitat, and endangered ecological communities to be impacted by the SSI;</li> <li>(iii) details of mitigation measures to be implemented during construction to minimise impacts on native fauna and vegetation (particularly threatened species and endangered ecological communities and their habitats), including measures to be implemented in those areas that will not be cleared. Measures shall include, but not necessarily be limited to, the mitigation measures set out in this infrastructure approval, delineation of sensitive areas, a protocol for the removal and relocation of fauna during clearing, fauna rescue procedure, appropriate topsoil management, erosion and sediment control, and construction worker education;</li> <li>(iv) a procedure for dealing with unexpected finds of threatened species and endangered ecological communities and their habitat identified during construction, including stopping works and notification to the <b>EESG</b> and the Department, determination of appropriate mitigation measures in consultation with the <b>EESG</b> (including relevant re-location measures), and updating of biodiversity offset requirements consistent with condition C4;</li> <li>(v) procedures for clearing blockages in waterways resulting from construction of the SSI;</li> <li>(vi) weed management measures focusing on early identification of invasive weeds and effective management controls;</li> <li>(vii) proposed revegetation and rehabilitation measures, including identification of flora species and sources, completion criteria and measures for the management and maintenance of rehabilitated/ revegetated areas;</li> <li>(viii) a description of how the effectiveness of management measures would be monitored and linked to the Ecological Monitoring Program required under condition C3; and</li> <li>(ix) mechanisms for the monitoring, review and amendment of this plan.</li> </ul>	Compliant	20/12/2019

Condition Number	Section	Condition/Compliance Requirement	Status	Completion Date
E63 (continued)	CEMP	<p>(c) A Construction Noise and Vibration Management Plan to detail how construction noise and vibration impacts will be minimised and managed. The Plan shall include, but not necessarily be limited to:</p> <ul style="list-style-type: none"> <li>(i) identification of the nearest sensitive receivers and relevant construction noise and vibration goals applicable to the SSI;</li> <li>(ii) identification of key noise and vibration generating construction activities (based on representative construction scenarios) that have the potential to impact on surrounding sensitive receivers;</li> <li>(iii) details on predicted worst-case construction noise impacts, including traffic noise and cumulative noise impacts associated with on-site construction activities and construction of the adjacent proposed HRR project;</li> <li>(iv) identification of all feasible and reasonable measures for minimising construction noise and achieving the relevant noise management goals at sensitive receivers (including construction traffic noise impacts) required by condition E21;</li> <li>(v) procedures and mitigation measures to ensure relevant vibration criteria are achieved, including applicable buffer distances for vibration intensive works, use of low-vibration generating equipment/vibration dampeners or alternative construction methodology, and pre- and post- construction dilapidation surveys of sensitive structures where vibration is likely to result in damage to structures;</li> <li>(vi) a protocol for minimising the cumulative construction noise and vibration impacts of the SSI and proposed <b>ARTC Hexham Relief Roads project, prepared in consultation with ARTC</b>;</li> <li>(vii) procedures for notifying sensitive receivers of construction activities that are likely to affect their noise and vibration amenity, as well as procedures for dealing with and responding to noise complaints;</li> <li>(viii) a safety risk assessment to determine the availability of safe alternatives to 'beeper' type reversing or movement alarms on vehicles, plant and equipment used during the construction of the SSI;</li> <li>(ix) a program and procedures for construction noise and vibration monitoring indicating monitoring frequency and location, monitoring methods, responsibilities for monitoring and assessment, methods for recording and reporting monitoring results, and procedures to be followed where exceedances of relevant noise and vibration goals are detected; and</li> <li>(x) mechanisms for the monitoring, review and amendment of this Plan.</li> </ul>	Compliant	21/10/2022
E63 (continued)	CEMP	<p>(d) A Construction Soil and Water Management Plan to manage surface water and groundwater impacts during the construction of the SSI. The Plan shall be developed in consultation with the City of Newcastle, <b>the Water Group</b> and Hunter-Central Rivers CMA and include, but not necessarily be limited to:</p> <ul style="list-style-type: none"> <li>(i) surface water and groundwater impact assessment criteria consistent with the principles of the Australian and New Zealand Environment Conservation Council (ANZECC) guidelines;</li> <li>(ii) identification of all potential sources of water pollution and contaminants and details on the mitigation measures to be implemented to prevent the discharge of pollutants and contaminants from the SSI site, including saline and acid sulphate soils, and groundwater contaminants;</li> <li>(iii) details of the control measures to be employed to minimise surface and groundwater impacts, including drawdown of groundwater levels and connections with surface waters;</li> <li>(iv) management measures to be used to minimise surface and groundwater impacts, including identification of water treatment measures and discharge points, details of how spoil and fill material required by the SSI will be sourced, handled, stockpiled, reused and managed; erosion and sediment control measures; salinity control measures and the consideration of flood events;</li> <li>(v) management measures for contaminated material and a contingency plan to be implemented in the case of unanticipated discovery of contaminated material during construction;</li> <li>(vi) details on the methods for managing surface water runoff (including inlets and outlets and their capacity) and any accumulation of groundwater (including from excavation and dewatering) and surface water, including procedures for handling, treatment and disposal and/or reuse;</li> <li>(vii) details of how construction activities would be managed and mitigated to minimise erosion and sedimentation, consistent with condition E27;</li> <li>(viii) a program for reporting on the effectiveness of the water management measures and sediment and erosion controls against performance criteria; including procedures for rectifying any non-compliances;</li> <li>(ix) water quality monitoring consistent with the requirements of condition C19;</li> <li>(x) contingency plans to be implemented in the event of major fuel spills or other chemicals;</li> <li>(xi) an Acid Sulfate Soils Management Plan consistent with the Acid Sulfate Soils Manual, including a contingency plan to deal with the unexpected discovery of actual or potential acid sulfate soils, including procedures for the investigation, handling, treatment and management of such soils and water seepage;</li> <li>(xii) a contingency plan in the event that groundwater levels are observed to fall below the top of areas defined as containing potential acid sulfate soils;</li> <li>(xiii) a water balance plan detailing the source and security of construction water supply, water use on site, and water and wastewater management on site;</li> <li>(xiv) measures to minimise stream hydrology impacts, including measures to stabilise bank structures where required and details of proposed buffer zones adjacent to waterways;</li> <li>(xv) a description of how the effectiveness of these actions and measures would be monitored during the proposed works, clearly indicating how often this monitoring would be undertaken, the locations where monitoring would take place, how the results of the monitoring would be recorded and reported, and, if any exceedance of the criteria is detected how any non-compliance can be rectified; and</li> <li>(xvi) mechanisms for the monitoring, review and amendment of this Plan</li> </ul>	Compliant	21/10/2022



Condition Number	Section	Condition/Compliance Requirement	Status	Completion Date
E63 (continued)	CEMP	<p>(e) a Construction Heritage Management Plan to detail how construction impacts on Aboriginal and Historic heritage will be minimised and managed. The Plan shall be developed in consultation with the EESG and registered Aboriginal stakeholders (for Aboriginal heritage), and include, but not necessarily be limited to:</p> <p>(i) In relation to Aboriginal Heritage -  I. identification of Aboriginal objects directly and indirectly affected by the SSI,  II. details of management measures to be carried out in relation to Aboriginal heritage, including a detailed methodology and strategies for protection, monitoring, salvage, and conservation of objects associated with the SSI,  III. procedures and timing for implementing the requirements of conditions E13 to E16 inclusive,  IV. procedures for dealing with previously unidentified Aboriginal objects (excluding human remains) including cessation of works in the vicinity, assessment of the significance of the item(s), determination of appropriate mitigation measures by a suitably qualified archaeologist in consultation with the Department, EESG and registered Aboriginal stakeholders, procedure for determining when works can re-commence, and assessment of the consistency of any new Aboriginal heritage impacts against the approved impacts of the SSI, and registering of any new site(s) in the AHIMS database,  V. details of an appropriate keeping place agreement with local Aboriginal community representatives for any Aboriginal objects salvaged during construction,  VI. procedures for ongoing Aboriginal consultation and involvement for the duration of the SSI, and  VII. procedures for managing the discovery of confirmed or potential human remains, including the temporary cessation of works in the vicinity and notification to the NSW Police Force, EESG, the Department and registered Aboriginal stakeholders and not recommencing any works in the area unless authorised by the EESG and/ or the NSW Police Force;</p> <p>(ii) In relation to Historic Heritage -  I. developed in consultation with the Heritage Division,  II. identification of heritage items directly and indirectly affected by the SSI,  III. details of management measures to be implemented to prevent and minimise impacts on heritage items including measures to protect unaffected sites during construction works in the vicinity,  IV. details of the Interpretation Plan as required by condition E17;  V. details of monitoring and reporting requirements for impacts on heritage items;  VI. procedures for dealing with previously unidentified heritage items, (including cessation of works in the vicinity), assessment of the significance of the item(s) and determination of appropriate mitigation measures including when works can re-commence by a suitably qualified and experienced archaeologist in consultation with the Heritage Division and the Department, and assessment of the consistency of any new heritage impacts against the approved impacts of the SSI;  (iii) heritage training and induction processes for construction personnel (including procedures for keeping records of inductions) and obligations under the conditions of this approval including site identification, protection and conservation of Aboriginal and historic heritage; and  (iv) mechanisms for the monitoring, review and amendment of this Plan.</p>	Compliant	21/10/2022
E63 (continued)	CEMP	<p>(f) a Construction Contamination Management Plan to detail how contaminated materials, water and soil will be managed to protect human health and the environment. The Plan shall include, but not necessarily be limited to:</p> <p>(i) location of areas identified as contaminated;  (ii) procedures for the sampling and assessment of excavated material at depth consistent with the requirements of condition E30;  (iii) procedures for the sampling and testing of ballast, chitter and tailings consistent with the requirement of condition E32;  (iv) procedures for the classification, remediation, handling and monitoring of contaminated materials, water and soils identified during construction (including asbestos), consistent with the Remediation Action Plan included as Appendix H in the document referred to in condition B1(c).  (v) a contingency plan to be implemented in the case of unanticipated discovery of contaminants;  (vi) a procedure for updating the Remediation Action Plan consequent to amendments in the remediation procedures or the discovery of contaminants during construction;  (vii) program for validating soil quality upon completion of remediation; and  (viii) mechanisms for the monitoring, review and amendment of this Plan.</p> <p>Prior to construction of the Turning Angle Works, the Proponent must submit revised plans including the Turning Angle Works to the Environmental Representative for approval. The ER may approve minor updates to the plan without further consultation with public authorities. The plans required by Condition E63(e) only apply to the Turning Angle Works insofar as they provide for unexpected finds procedures and staff training and induction.</p> <p>The reference to the ecological monitoring plan referred to in condition E63(b)(viii) does not apply to the Turning Angle Works.</p>	Compliant	21/10/2022

Condition Number	Section	Condition/Compliance Requirement	Status	Completion Date
F1	Operation Environmental Management	Prior to commencement of operations, the Proponent shall incorporate the SSI into an existing environmental management system administered by the Proponent and prepared in accordance with the AS/NZS /SO 14000 Environmental Management System series or equivalent.	Compliant	06/03/2023
F2	Operation Environmental Management	<p>Prior to the commencement of operation, or as otherwise agreed by the <b>Planning Secretary</b>, the Proponent shall prepare and implement an Operation Environmental Management Plan for the SSI. The Plan shall detail the environmental management framework, practices and procedures to be followed during operation of the SSI. The Plan shall be consistent with the document Guideline for the Preparation of Environmental Management Plans (DIPNR, 2004). The Plan shall be prepared in consultation with the relevant government authorities and include, but not necessarily be limited to:</p> <ul style="list-style-type: none"> <li>(a) a description of all relevant activities to be undertaken during operation of the SSI;</li> <li>(b) statutory and other obligations that the Proponent is required to fulfil during operation including all approvals, consultations and agreements required from authorities, and key legislation and policies;</li> <li>(c) details of how the SSI's environmental performance will be monitored and what actions will be taken to address identified adverse environmental impacts;</li> <li>(d) where required, measures to monitor and maintain biodiversity offset measures implemented in accordance with condition C4 of this approval;</li> <li>(e) measures to monitor and maintain the effectiveness of flora and fauna management measures, including revegetated areas, landscaped areas and the control of the spread of weeds;</li> <li>(f) measures to monitor and manage noise impacts;</li> <li>(g) measures to monitor and control soil erosion and the discharge of sediment and other pollutants to surrounding lands and waterways;</li> <li>(h) procedures for periodic monitoring of groundwater depth and flow and groundwater quality in the vicinity of the SSI and groundwater seepage, including the location and frequency of monitoring;</li> <li>(i) a contingency plan to address changes in groundwater depths and flows and/or groundwater quality and groundwater seepage into the drainage swales;</li> <li>(j) measures to monitor and manage hazards and risks;</li> <li>(k) management and maintenance measures for the floating wetlands, and for the entire stormwater system, including pits and pipes, cess drains, sediment basins, gross pollutant traps and detention basins;</li> <li>(l) management measures for maintaining the Purgatory Creek culvert;</li> <li>(m) emergency management procedures;</li> <li>(n) measures for maintaining the stormwater management system including the drainage swales; and</li> <li>(o) measures to minimise dust generation from internal service roads.</li> </ul>	Compliant	06/03/2023
F2 (continued)	Operation Environmental Management	<p>The Plan shall be submitted for the <b>Planning Secretary's</b> approval no later than one month prior to the commencement of operation, or as otherwise agreed by the <b>Planning Secretary</b>. Operation of the SSI shall not commence until written approval has been received from the <b>Planning Secretary</b>.</p> <p><b>Prior to construction of the Turning Angle Works, the Proponent must provide a copy of the revised plan including the Turning Angle Works to the Environmental Representative for approval. The ER may approve minor updates to the plan without further consultation with public authorities.</b></p> <p>Nothing in this condition precludes the Proponent from updating an existing Operational Environment Management Plan, (environmental) management system, existing policies and/or procedures to meet this requirement, providing the Operational Environment Management Plan demonstrates, to the satisfaction of the <b>Planning Secretary</b>, where the relevant conditions of this approval have been addressed.</p> <p>Note: The approval of an Operation Environmental Management Plan does not relieve the Proponent of any requirement associated with this SSI approval. If there is an inconsistency with an approved Operation Environmental Management Plan and the conditions of this SSI approval, the requirements of this SSI approval prevail.</p>	Compliant	06/03/2023

Condition Number	Section	Condition/Compliance Requirement	Status	Completion Date
F3	Operation Environmental Management	<p>Within 15 months of the completion of construction of the SSI, or as otherwise agreed by the Director-General, the Proponent shall commission an independent, qualified person or team to undertake an Operational Performance Audit of the SSI. The independent person or team shall be approved by the Director-General prior to the commencement of the Audit. The Operational Performance Audit Report shall be submitted to the Director-General within one month of the completion of the Audit, unless otherwise agreed by the Director-General. The Audit shall:</p> <p>(a) assess compliance with the requirements of this approval, and other licences and approvals that apply to the SSI;</p> <p>(b) assess the operational performance of the SSI against the predictions made and conclusions drawn in the documents referred to under condition B1 of this approval; and</p> <p>(c) review the effectiveness of the environmental management of the SSI, including any environmental impact mitigation works.</p>	Not triggered	1/02/2017
F4		<p>The Proponent shall undertake a noise and vibration compliance assessment to confirm the predictions of the noise assessment included at B1 and the limits referred to in condition C2. The noise and vibration compliance assessment shall be developed in consultation with the EPA and be undertaken within 12 months of the commencement of operation of the SSI, or as otherwise agreed by the Director General. The assessment shall include, but not necessarily be limited to:</p> <p>(a) noise and vibration monitoring and compliance assessment, to assess compliance with conditions C1 and C2 of this approval;</p> <p>(b) methodology for assessment, including the assessment of worst-case scenarios;</p> <p>(c) details of any complaints received relating to operational noise and vibration impacts;</p> <p>(d) any required recalibration of the noise and vibration model;</p> <p>(e) consideration of the cumulative noise and vibration impacts associated with the Project and the proposed ARTC Hexham Relief Roads project;</p> <p>(f) consideration of noise impacts to the Hexham Swamp Reserve with reference to the passive recreation criteria under the INP;</p> <p>(g) an assessment of the performance and effectiveness of the applied noise and vibration mitigation measures; and</p> <p>(h) identification, if required, of further noise and vibration mitigation measures to meet the requirements of C1 and C2 of this approval.</p> <p>A Noise and Vibration Compliance Assessment Report providing the results of the assessment shall be submitted to the Director-General and the EPA within 60 days of its completion. If the assessment indicates an exceedance of the noise and vibration objectives identified, the Proponent shall implement further feasible and reasonable measures (where required) to mitigate these exceedances in consultation with affected property owners. If there is a dispute regarding the implementation of at-receiver treatments, either party may refer the matter to the Director-General for resolution whose decision shall be final.</p>	Not triggered	29/03/2017
F4(a)		<p>The Proponent shall undertake a noise and vibration compliance assessment, consistent with the requirement of condition F4 to include the Turning Angle Works within 12 months of the commencement of operation of the Turning Angle Works.</p>	Not triggered	5/10/2021
F5		<p>A Flood Review Report shall be prepared following each of the following flood events at the SSI site – 1%, 2%, 5% and 10% AEP flood events to assess the actual flood impacts against those predicted in Appendix D of the Preferred Infrastructure Report referred to in condition B1(c) and the Modification Report referred to in condition B1(d). The Report shall be prepared by an appropriately qualified person(s) and include:</p> <p>(a) Identification of the properties and infrastructure affected by flooding during the reportable event;</p> <p>(b) A comparison of the actual extent, level and duration of the flooding event against the impacts predicted in Appendix D of the document referred to in condition B1(c);</p> <p>(c) Where the actual extent and level of flooding exceeds the predicted level with the consequent effect of adversely impacting on property(ies), structures and infrastructure,</p> <p>identification of the measures to be implemented to reduce future impacts of flooding including the timing and responsibilities for implementation. Flood mitigation measures shall be developed in consultation with the affected property/structure/infrastructure owners, the Water Group and City of Newcastle.</p>	Not triggered	Ongoing

\*RED TEXT – Text inserted into MPO7\_0171 as part of MOD 1

GREY TEXT – Condition not applicable to the Turning Angle

## APPENDIX B – Non-Compliances Register

Condition Number	Condition	Non-Compliance Details	Status	Reported to	Reported on	Incident Date	Action	Action Date
C19	Surface and Groundwater Monitoring Program	<p>Turbidity was not gauged during November monthly and December quarterly events due to supplier not providing the correct Water Quality Monitor. Select wells were not analysed for field turbidity in March due to equipment malfunction.</p> <p>Refer to Appendix C for full details.</p>	Non-Compliant	DPE	11/03/2024	Multiple	<p>Contractor is engaging with equipment supplier to review dates field equipment is made available to ensure any provided tools are working and suitable.</p> <p>Where field results are not taken lab results are available which are more accurate and relied upon for reporting.</p>	Ongoing
C19	Surface and Groundwater Monitoring Program	<p>During the 24 February rainfall event sampling, thermotolerant coliforms were not taken due to handling restrictions meaning analysis would have been conducted outside of holding times. Sampling was undertaken at the next opportunity on the 28 February.</p> <p>Refer to Appendix C for full details</p>	Non-Compliant	DPE	11/03/2024	24 February	Review alternate options to address holding time restrictions.	Ongoing
C19	Surface and Groundwater Monitoring Program	<p>SWL was unable to be obtained from MW308R during the December quarterly (Q4) as the probe was blocked by a well blockage.</p> <p>Refer to Appendix C for full details</p>	Non-Compliant	DPE	11/03/2024	December Q4	Inspect well integrity.	Ongoing

APPENDIX C – Hexham TSF Annual Water Monitoring Report  
2022 (GHD, February 2023)



# Annual Water Monitoring Report 2023

## Hexham Train Support Facility

Aurizon Operations Limited

08 March 2024

→ The Power of Commitment





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**Document status**

Status Code	Revision	Author	Reviewer		Approved for issue		
			Name	Signature	Name	Signature	Date
S4	0	L. Parkinson	L Maranciak		A Barron		27/02/24
S4	1	L. Parkinson	L Maranciak		A Barron		08/03/24

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# Executive summary

Aurizon Operations Limited (Aurizon) engaged GHD Pty Ltd (GHD) to conduct water quality monitoring at their Hexham NSW Long Term Train Support Facility (TSF) (the Site). The scope of work includes surface and groundwater monitoring in accordance with the requirements of Operational Environment Management Plan (OEMP) and subsequent reporting of results. This report summarises the surface and groundwater conditions at the Site for the 2023 monitoring period.

The Site's monitoring network comprises 11 groundwater wells and 15 surface water (SW) locations (Figure 1.1). Surface and groundwater monitoring is required on a quarterly basis, with additional surface water field monitoring undertaken monthly. Surface water monitoring is also required in response to high rainfall events (greater than 75 mm of rainfall over a period of five consecutive days).

This report incorporates data and information detailed in the following 2023 quarterly monitoring reports previously submitted to Aurizon:

- GHD (2023a) Aurizon Hexham Compliance Water Monitoring, Quarterly Water Monitoring – Q1 2023. 27 April 2023.
- GHD (2023b) Aurizon Hexham Compliance Water Monitoring, Quarterly Water Monitoring – Q2 2023. 1 August 2023.
- GHD (2023c) Aurizon Hexham Compliance Water Monitoring, Quarterly Water Monitoring – Q3 2023. 7 November 2023.
- GHD (2024a) Aurizon Hexham Compliance Water Monitoring, Quarterly Water Monitoring – Q4 2023. 12 February 2024.

The objectives of the surface water and groundwater monitoring program were to complete the sampling regime in accordance with the OEMP and ensure operational compliance. The overarching objective is to maintain environmental standards and inform management of potential water-related environmental risks should they arise.

The 2023 monitoring program indicated most contaminants of potential concern (CoPC) were below the adopted site criteria, with some exceedances occurring within metal, nutrient, TRH fractions and coliform suites. Most of the exceedances remained within historical ranges with a few exceptions, specifically metals and TRH fractions. Generally, the exceptions appeared to be spike occurrences; however, some increasing trends have been noted in surface water for iron, and in electrical conductivity and nitrogen.

Further, field electrical conductivity, filtered aluminium and filtered cadmium in groundwater exceeded historical ranges at the end of 2023 and will be monitored in early 2024 to identify if these were spike occurrences or are an increasing trend.

This report is subject to, and must be read in conjunction with, the limitations set out in Section 8 and the assumptions and qualifications contained throughout the Report.

# Glossary

Abbreviation	Description
ALS	Australian Laboratory Services
ANZECC	Australian and New Zealand Environment and Conservation Council
BOD	Biological oxygen demand
BOM	Bureau of Meteorology
BTEXN	Benzene, toluene, ethylbenzene, xylenes, and naphthalene
CFU	Colony-forming unit
COC	Chain of custody
COPC	Contaminants of potential concern
DO	Dissolved oxygen
DP&E	Department of Planning and Environment
DQI	Data quality indicator
DQO	Data quality objective
DTW	Depth to water
EC	Electrical conductivity
EPA	NSW Environment Protection Authority
GME	Groundwater monitoring event
HSE	Health Safety and Environment
JSEA	Job Safety Environmental Analysis
LNAPL	Light non-aqueous phase liquid
LOR	Limit of reporting
m bgl	Metres below ground level
m bTOC	Metres below top of casing
ME	Monitoring event
MHL	Manly Hydraulics Laboratory
mg/L	Milligrams per litre
NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
OEMP	Operational Environment Management Plan
OSGMP	Operational Surface and Groundwater Management Plan
PAH	Polycyclic aromatic hydrocarbon
QA/QC	Quality assurance/quality control
REDOX	Oxidation-reduction potential
RPD	Relative Percent Difference
SFOP	Standard field operating procedures
SW	Surface water
SWL	Standing water level

Abbreviation	Description
TOC	Top of casing
TRH	Total recoverable hydrocarbons
TSF	Train Support Facility
TSS	Total suspended solids
µg/L	Micrograms per litre

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# 1. Introduction

Aurizon Operations Limited (Aurizon) engaged GHD Pty Ltd (GHD) to conduct water quality monitoring at their Hexham NSW Long Term Train Support Facility (TSF) (the Site). The scope of work includes surface and groundwater monitoring in accordance with the requirements of Operational Environment Management Plan (OEMP) and subsequent reporting of results. This report summarises the surface and groundwater conditions at the Site over the 2023 monitoring period.

The Site's monitoring network comprises 11 groundwater wells and 15 surface water (SW) locations (Figure 1.1). Surface waters comprise 12 flow sites, rainfall permitting, and three onsite water storage basins. Surface and groundwater monitoring is required on a quarterly basis, with additional surface water field monitoring undertaken on a monthly basis. Surface water monitoring is also required in response to high rainfall events.<sup>1</sup>

Water monitoring at the site is undertaken in accordance with the requisites of the Operational Surface and Groundwater Management Plan (OSGMP) (Aurizon, 2021b). Section 2 of the OSGMP states the requirement for surface and groundwater monitoring during the operational phase of Hexham TSF.

This report incorporates data and information detailed in the following 2023 quarterly monitoring reports previously submitted to Aurizon:

- GHD (2023a) Aurizon Hexham Compliance Water Monitoring, Quarterly Water Monitoring – Q1 2023. 27 April 2023.
- GHD (2023b) Aurizon Hexham Compliance Water Monitoring, Quarterly Water Monitoring – Q2 2023. 1 August 2023.
- GHD (2023c) Aurizon Hexham Compliance Water Monitoring, Quarterly Water Monitoring – Q3 2023. 7 November 2023.
- GHD (2024a) Aurizon Hexham Compliance Water Monitoring, Quarterly Water Monitoring – Q4 2023. 12 February 2024.

## 1.1 Objectives

The objectives of the surface water and groundwater monitoring program were to complete the sampling regime in accordance with the OEMP and ensure operational compliance. The overarching objective is to maintain environmental standards and inform management of potential water-related environmental risks should they arise.

## 1.2 Scope of work

The scope of work completed during 2023 comprised the following:

- Preparation of Job Safety Environmental Analysis (JSEA) documentation for each monitoring event completed during 2023.
- Four quarterly groundwater monitoring events (GME) (March, June, September, and December) comprising gauging and sampling of 11 groundwater monitoring wells; and inspection and subsequent sampling of 15 surface waters where and when water volumes permit.
- Monthly SW monitoring of three basins (reading of field parameters only).
- One rainfall response event (February) comprising inspection and sampling of 15 SW sites as a result of rainfall exceeding 75 mm over a 5-day period, as per the OSGMP requirements.
- Laboratory analysis of SW and groundwater samples as specified in Section 3.
- Quality assurance (QA) programs for each sampling event.
- Quality control (QC) sampling in the quarterly GMEs.
- Comparison of monitoring results to Site specific criteria.

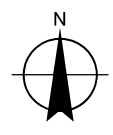
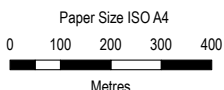
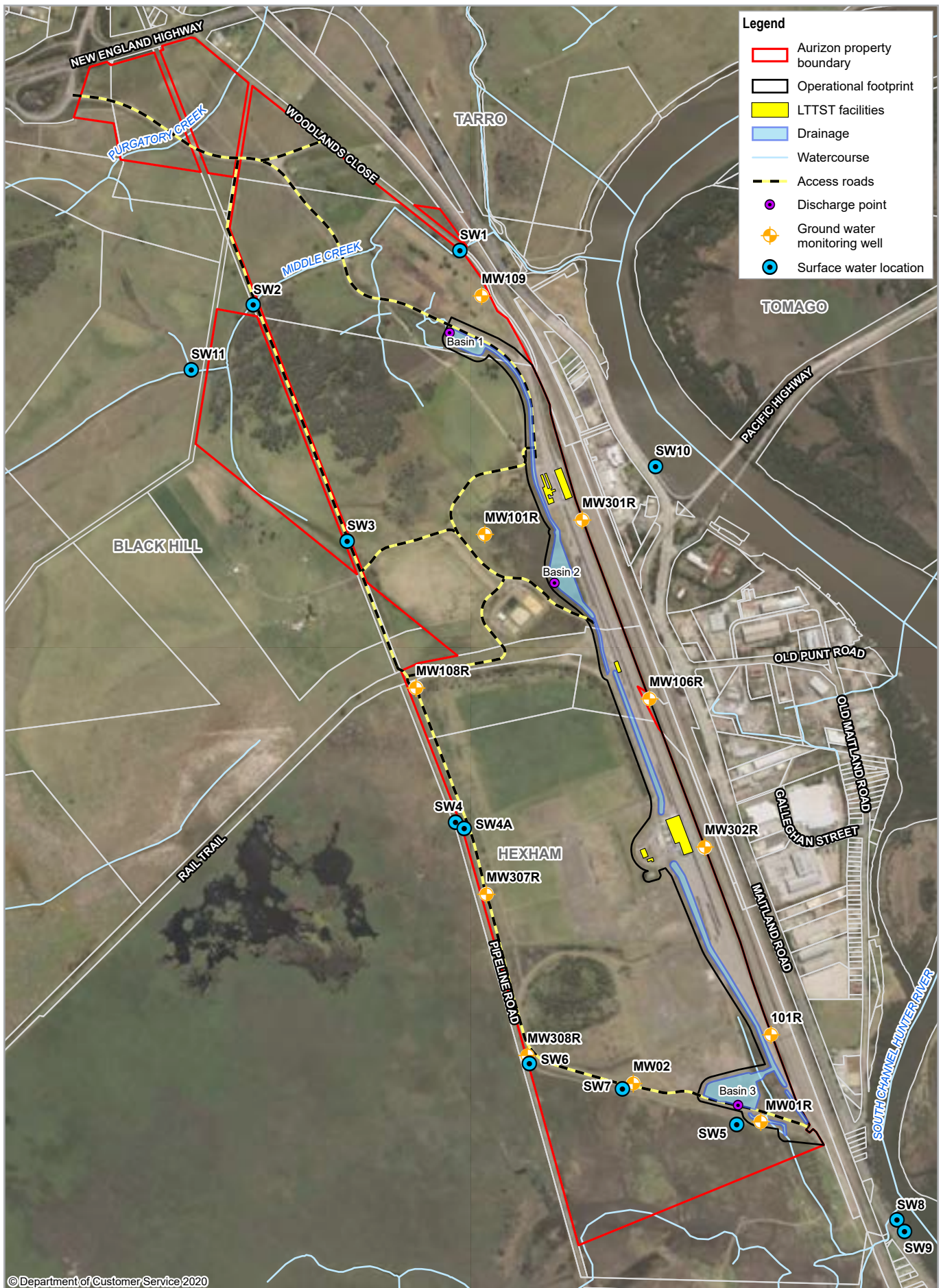
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<sup>1</sup> Greater than 75 mm of rainfall over a period of five consecutive days

- Historical water quality trend review.
- Preparation of quarterly monitoring reports and this annual report.

## **1.3 Limitations**

This report is subject to the limitations provided in Section 8.



Map Projection: Transverse Mercator  
Horizontal Datum: GDA 1994  
Grid: GDA 1994 MGA Zone 56

Aurizon Operations Limited  
Aurizon Hexham Compliance Water Monitoring

Project No. 12611010  
Revision No. 0  
Date 03/07/2023

**Surface and Groundwater  
Monitoring Locations**

**FIGURE 1**



## 2. Site description

The site is located along Maitland Road, Hexham, and is accessed via Pipeline Road to the north. The TSF has been developed on a 38-hectare (ha) portion of the site, parallel to the Main Northern Railway to the east. The remainder of the site is vacant and consists of cleared grassland.

### 2.1 Site identification

The site identification details are summarised in Table 2.1.

Table 2.1 Site identification details

Item	Description
Site Name	NSW Long Term Train Support Facility
Street Address	Maitland Rd, Hexham NSW 2322
Certificate of Title Details (Vol/Folio) and Parcel/ Lot Number	Lot 11 and 12 DP 1236873 Lot 101 to 106 DP 1189565 Lot 1 DP 155530 Lot 104 DP 1084709 Lot 2 DP 735456 Lot 10 DP 735235 Lot 102 DP 1084709
Area	255 ha
Property Occupier	Aurizon
Current Use	Provisioning (locomotive) and maintenance (locomotive and wagon)
Site Zoning	Coal stockpile area – IN3 (heavy Industry). Hexham Swamp – E1 (National Park and Nature Reserves). Main Northern Railway – SP2 (Infrastructure/Railway) (as per Newcastle Council LEP 2012)

### 2.2 Site operations

The key operational components of the site include:

- New connections to the Great Northern Railway.
- Train tracks parallel to the existing mainline and a shunt track at the northern part of the facility comprising 10.5 kilometres of railway track.
- A rail line turning angle in the southern portion of the site to allow locomotive turn arounds.
- A provisioning building, a combined maintenance and administrative centre, service vehicle garage, and bulk fuel storage area.
- Vehicular intersection and new road from the Tarro interchange and sealed internal access roads.
- A wastewater treatment plant with on-site effluent irrigation.

The following overview of site water management has been taken from the 2017 Annual Water Monitoring Report (Aurizon, 2018).

*“Water across the site is generally managed in accordance with the approved Operational Surface and Groundwater Management Sub-Plan (OSGMP) and Operational Stormwater Management Sub-Plan (OSWMP) which form appendices to the approved OEMP. Swales constructed for the TSF which drain the rail formation and other operational areas of the facility convey water to one of three Water Quality Control Basins (Basins). Groundwater and surface water are not permitted to mix in any of the three Basins. During construction, the presence of perched groundwater within the coal wash reject emplacement led to changes in design to achieve this desired outcome without facilitating the egress of groundwater off the site, and this improvement continues to support water quality management in the operational phase.”*

## 2.3 Surrounding land use and zoning

The surrounding land uses are summarised below in Table 2.2.

**Table 2.2** Description of surrounding land use and respective zonings

Orientation	Description of Surrounding Land Use	Zoning (Newcastle Council LEP 2012)
North	Cleared grazing land, followed by Woodlands Close and Pacific highway, hardstand and construction activities related to new roadworks, Hunter Water’s CTGM, then residential properties and Main Northern Railway	E2 (Environmental Conservation), SP2 (Infrastructure/Railway), E3 (Environmental Management)
East	Main Northern Railway, Pacific Highway, and then industrial properties	SP2 (Infrastructure/Railway), IN3 (heavy industry)
South	Cleared grazing land, Hunter Water’s CTGM, followed by Hunter Wetlands	E2 (Environmental Conservation), E1 (National Park and Nature Reserves)
West	Hunter Wetlands National Park	E1 (National Park and Nature Reserves)

## 2.4 Weather station data review

Rainfall data was obtained from the NSW Manly Hydraulics Laboratory (MHL) database for Hexham Bridge (station number 210448) between 1 January 2023 to 31 December 2023. Hexham Bridge station recorded a total annual rainfall of 704.5 mm for 2023, which was approximately half of the total for 2022 of 1389.5 mm. A summary of the Hexham Bridge rainfall data for 2023 is presented below in Figure 2.1.

As stipulated in the OSGMP, greater than 75 mm of rainfall over a period of five consecutive days is considered significant rainfall and triggers the requirement for surface water monitoring. GHD tracks rainfall via the MHL website ([www.mhl.nsw.gov.au/Station-210448](http://www.mhl.nsw.gov.au/Station-210448)) which provides live records for a 5-day period only. Based on this tracking, one significant rainfall event was recorded in February 2023, triggering the requirement for rainfall response surface water monitoring that was completed on 24 February. (Figure 2.1).

In Q4 2023, the record was subsequently updated such that an exceedance of the 75 mm trigger is recorded on 12 November 2023 (76.5 mm). No exceedance was reported in the real-time tracking hence no rainfall response monitoring was initiated. MHL has advised that data is adjusted, if required, using the observer readings of the actual water level against a known datum. Gaps in rainfall data can also occur due to equipment damage, telemetry or logger problems or other site issues. Still, a routine surface water monitoring event was conducted on 14 November 2023, in which only one of the three basins contained water.

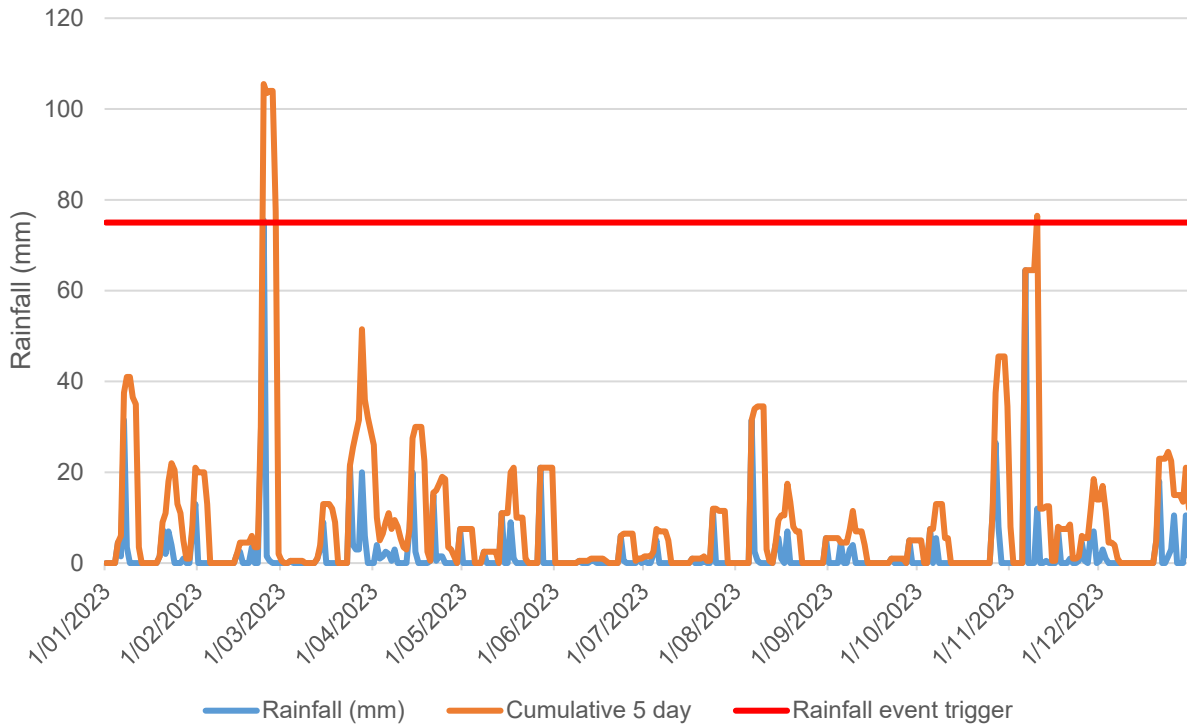


Figure 2.1 2023 Annual rainfall summary – Hexham Bridge (Station 210448<sup>2</sup>)

## 2.5 2023 Monitoring program

The field works completed as part of the 2023 monitoring program are provide in Table 2.3.

Table 2.3 2023 Monitoring program field works

Date	Field works completed	Associated Report
16 January 2023	Monthly surface water monitoring	GHD, 2023a
24 February 2023	Rainfall monitoring event	
28 February 2023	Monthly surface water monitoring	
22 March 2023	Quarterly monitoring	
18 April 2023	Monthly surface water monitoring	GHD, 2023b
4 May 2023	Monthly surface water monitoring	
27 June 2023	Quarterly monitoring	
11 July 2023	Monthly surface water monitoring	GHD, 2023c
15 August 2023	Monthly surface water monitoring	
26 September 2023	Quarterly monitoring	
19 October 2023	Monthly surface water monitoring	GHD, 2024a
14 November 2023	Monthly surface water monitoring	
13 and 18 December 2023	Quarterly monitoring	

<sup>2</sup> Source : <http://www.mhl.nsw.gov.au/Site-210448>.

### 3. Assessment criteria

Discharge criteria were developed for Aurizon by Douglas Partners (February 2014) based on the *Australian and New Zealand Guidelines for Fresh Water Quality* 95% species protection levels (ANZECC, 2000). The ANZECC 95% investigation levels apply to typical slightly to moderately disturbed fresh waters systems. Discharge criteria were issued to Department of Planning and Environment (DP&E) and approved as a component of the OSGMP.

Discharge criteria were categorised as A, B or C, based on the receiving environment:

- Category A (DCA) applies to Discharge Locations 1, 2 and 3 of the OSGMP. These locations discharge from the site to the Hunter River, via Middle Creek. The monitoring locations include SW1 (Middle Creek downstream of the project), SW2 (Middle Creek upstream of the project), and SW3 (culvert under Hunter Water easement that flows to Middle Creek). Additional surface water sampling locations added to the program post initiation also subject to category A criteria include SW8, SW9, SW10 and SW11.
- Category B (DCB) applies to Discharge Locations 4, 5 and 6 of the OSGMP. These locations discharge from the site to Hexham Swamp. The monitoring locations include SW4 and SW4A (western border of Aurizon’s land), SW5 (south-east corner of the project), and SW6 (south-west corner of Aurizon’s land), Basin 1 (north-east of Aurizon site along access road), Basin 2 (Within grassland on-site in Aurion’s land), and Basin 3 (Opposite SW5). SW7 was added as an additional surface water sampling location post initiation which is also subject to category B.
- Category C (DCC) applies to the on-site disposal of water by infiltrating to ground. There is currently no such practice occurring onsite however the criteria continue to be used for groundwater quality assessment. Category C criteria apply to all groundwater monitoring wells (101R, MW01R, MW02, MW101R, MW106R, MW108R, MW109, MW301R, MW302R, MW307R and MW308R).

The applicable guideline values (assessment criteria) are presented below in Table 3.1, along with the corresponding measurement units.

**Table 3.1** Surface and groundwater discharge criteria

Analyte	Units	Category A <sup>* #</sup>	Category B <sup>* #</sup>	Category C <sup>* ^</sup>	ANZECC 2000
Conductivity	µS/cm	40000	6000	20500	NC
pH	pH Units	6.5 - 8.5	5.5 - 8.5	5.5 - 8.5	6.5 - 8.5
Aluminium (Al)	mg/L	2.5	2.5	0.055	0.055
Arsenic (As)	mg/L	0.013	0.013	0.013	0.013
Cadmium (Cd)	mg/L	0.0002	0.0002	0.0002	0.0002
Chromium (Cr)	mg/L	0.004	0.002	0.002	0.001
Copper (Cu)	mg/L	0.0045	0.0026	0.0071	0.0014
Iron (Fe)	mg/L	35	1.3	350	0.3
Lead (Pb)	mg/L	0.0044	0.0034	0.0034	0.0034
Mercury (Hg)	mg/L	0.0006	0.0006	0.0006	0.0006
Nickel (Ni)	mg/L	0.017	0.011	0.18	0.011
Zinc (Zn)	mg/L	0.054	0.019	0.65	0.008
Ammonia	mg/L	0.9	0.9	25	0.9
Turbidity	NTU	60	50	1200	50
Total Susp. Solids	mg/L	50	40	650	NC
TKN	mg/L	8	4	12	NC
Total Nitrogen	mg/L	10	4	12	0.5
Total Phosphorus	mg/L	2.75	1.9	14.5	0.05

Analyte	Units	Category A* #	Category B* #	Category C* ^	ANZECC 2000
Faecal Coliforms	CFU/100mL	1500	500	2000	150
BOD	mg/L	40	15	30	15
TRH C <sub>6</sub> -C <sub>36</sub> **	mg/L	0.15	0.15	0.3	NC
Naphthalene	mg/L	0.05	0.05	0.05	0.05
Phenanthrene	mg/L	0.0006	0.0006	0.0015	0.0006
Anthracene	mg/L	0.0006	0.0006	0.00095	0.00001
Fluoranthene	mg/L	0.001	0.001	0.0015	0.001
Benzo(a) pyrene	mg/L	0.0006	0.0001	0.0007	0.0001
Total PAHs	mg/L	0.01	0.0015	0.02	NC
Benzene	mg/L	0.95	0.95	0.95	0.95
Ethyl Benzene	mg/L	0.08	0.08	0.08	0.08
Toluene	mg/L	0.18	0.18	0.18	0.18
Xylenes (total)	mg/L	0.625	0.625	0.625	0.625

\*Category A (Hunter River): Discharge Locations 1, 2 and 3 (SW1 to SW3, SW8 to SW11)

\*Category B (Hexham Nature Reserve): Discharge Locations 4, 5 and 6 (SW4 to SW7 and Basin 1 to Basin 3)

\*Category C (controlled on site infiltration in designated bunded area)

# Total metals

^ Filtered metals

\*\* Total sum reported for TRH C<sub>10</sub> – C<sub>36</sub> fractions only. Where the C<sub>6</sub>-C<sub>9</sub> fraction concentration is >LOR, the concentration has been added to the TRH C<sub>10</sub> – C<sub>36</sub> (sum of total) and compared to the applicable criteria. Where the C<sub>6</sub>-C<sub>9</sub> fraction concentration is <LOR, half of the C<sub>6</sub>-C<sub>9</sub> LOR has been added to the TRH C<sub>10</sub> – C<sub>36</sub> (sum of total) concentration conservatively.

### 3.1 Laboratory analysis

Water samples were submitted to laboratories accredited by the National Association of Testing Authorities (NATA). Primary samples were submitted to Eurofins Mgt (Eurofins) and secondary samples to ALS Environmental (ALS). The laboratory analytical suite performed was consistent with the requirements of the OEMP (Table 3.2).

All LORs were below their respective assessment criteria over the annual monitoring period except for the following PAHs:

- Anthracene
- Benzo(a)pyrene
- Phenanthrene (surface water samples only)

Table 3.2 Hexham water quality analytical suite

Parameter		Primary Laboratory Limit of Reporting (Eurofins) <sup>2</sup>	Units
Physico-chemical	BOD	2	mg/L
	Conductivity	10	µS/cm
	pH	0.1	pH Units
	Turbidity	1	NTU
	Total Suspended Solids	5	mg/L

Parameter		Primary Laboratory Limit of Reporting (Eurofins) <sup>2</sup>	Units
Heavy Metals <sup>1</sup>	Aluminium	0.05	mg/L
	Arsenic	0.001	mg/L
	Cadmium	0.0002	mg/L
	Chromium	0.001	mg/L
	Copper	0.001	mg/L
	Iron	0.05	mg/L
	Lead	0.001	mg/L
	Mercury	0.0001	mg/L
	Nickel	0.001	mg/L
	Zinc	0.005	mg/L
Organics	Ammonia	0.01	mg/L
	Total Oxidised Nitrogen	0.05	mg/L
	TKN	0.1	mg/L
	Total Nitrogen	0.1	mg/L
	Total Phosphorus	0.01	mg/L
Microbiological	Faecal Coliforms	1	cfu/100mL
Total hydrocarbon fractions	TRH C <sub>6</sub> -C <sub>36</sub>	Various	µg/L
Polycyclic aromatic hydrocarbons	Naphthalene	1	µg/L
	Phenanthrene	1	µg/L
	Anthracene	1	µg/L
	Fluoranthene	1	µg/L
	Benzo(a) pyrene	1	µg/L
	Total PAHs	1	µg/L
Volatile hydrocarbons	Benzene	1	µg/L
	Ethyl Benzene	1	µg/L
	Toluene	1	µg/L
	Xylenes (total)	3	µg/L
	Naphthalene	1	µg/L

- <sup>1</sup>Metals analysis is total and dissolved for surface water and groundwater, respectively.
- <sup>2</sup> Shaded cells indicate the LOR is above the site assessment criteria.

## 4. Quality assurance/quality control

A QA program inclusive of QC sampling was completed as part of each quarterly event, and details of the QA programs have been presented in the four quarterly reports (GHD 2023a, 2023b, 2023c, and 2024a). An overarching summary of the QA program is presented in the following sub-sections.

### 4.1 Quality systems

GHD operates under a Practice of Quality Management System certified to AS/NZS ISO 9001:2015 and an Environmental Management System certified to ISO 14001:2015.

The Quality and Environmental management systems prescribe a structured approach to quality and environmental management which covers:

- Job establishment and planning
- Document control
- Design control and review
- Verification of deliverables
- Job records
- Internal project compliance audits
- The identification and management of significant environmental risks

### 4.2 Quality assurance

A series of QA procedures were implemented to maintain the quality of data collected by GHD staff. QA procedures included:

- Use of standardised field sampling forms (Appendix F)
- Use of standardised field sampling methods
- Documenting calibration and use of field instruments (Appendix G)
- Collection of QC samples
- Use of laboratory supplied sampling containers and appropriate storage
- Collection of field duplicates and inter-laboratory duplicates
- A review of the data for potentially erroneous and/or outlier results by comparison to historical data

Data quality objectives are summarised in Appendix C. Sampling methodology is presented in Appendix D.

### 4.3 Field QA/QC

An evaluation of QA/QC was based on the collection and analysis of the QC samples outlined in Table 4.1. A summary of QC samples collected in 2023 is presented in Table 4.2.

*Table 4.1 QC sampling schedule*

Monitoring event	QC Samples	Analysis
Q1 monitoring events	Duplicates (1 x inter-laboratory and 1 x intra-laboratory)	BTEXN, TRH, PAHs, heavy metals, and nutrients
	2x Rinsate Blank	
Q2, Q3 and Q4 monitoring events	Duplicates (1 x inter-laboratory and 1 x intra-laboratory)	
	1x Rinsate Blank	

Table 4.2 QC sample summary

Monitoring event	QC Sample Type	
	Duplicate : Primary	Rinsate Blank
Q1	2 : 13	2 samples analysed, 3 detects <sup>1</sup>
Q2	2 : 13	1 sample analysed, 0 detects
Q3	2 : 11	1 sample analysed, 2 detects <sup>2</sup>
Q4	2 : 12	1 sample analysed, 4 detects <sup>3</sup>

<sup>1</sup>Samples RB01 and RB02 detected trace levels of total phosphorus and TRH fractions F1 and C6-C10

<sup>2</sup>Sample RB01 detected trace levels of Nitrate (as N) and total iron.

<sup>3</sup>Sample RB01 detected trace levels of TRH F3, C15-C28 and Sums of fractions. While TRH fractions were detected in this sample, no TRH detections occurred at any location during the quarterly monitoring event.

### 4.3.1 Relative percentage differences

An evaluation of relative percentage difference results for Q1 through Q4 monitoring events is detailed in the respective quarterly reports (GHD 2023a, 2023b, 2023c, and 2024a). The RPD exceedances observed over the 2023 monitoring period were not considered significant, and the primary results were considered valid.

### 4.3.2 Rinsate blanks

Generally, one rinsate blank was analysed by the laboratory during each monitoring event, in accordance with Table 4.2. During the Q1 and Q2 events two rinsate blanks were submitted. As noted above, nutrients (nitrate, nitrogen and/or total phosphorus), metals (iron) and select TRH fractions were detected at low levels during each monitoring event. This is generally consistent to the 2022 monitoring period apart from the detections of TRH. The concentrations detected in rinsate samples did not influence the decision rule for any primary samples, therefore the reported data remains acceptable.

During the 2023 monitoring period, site decontamination procedures were reviewed, and improvements made to prevent future detections. GHD therefore considers the continued detections to be due to the rinsate water itself and suggest collection of a field blank sample in future monitoring events.

## 4.4 Laboratory QA/QC

QC sample analysis was also completed by the contracted laboratories in accordance with their NATA accreditation as laboratories suitable for environmental contaminant analysis. Laboratory QC sample analysis comprised duplicates, method blanks, control samples, laboratory-controlled spikes, matrix spikes, and sample surrogates. All QC sample results were accepted for each GME, as detailed within each quarterly report. Copies of the laboratory reports are provided in Appendix E.

## 4.5 QA/QC Summary

From the review of the QA/QC program for 2023, surface and groundwater analytical data were concluded to be of acceptable quality upon which to draw meaningful conclusions regarding impacts to surface and groundwater at the site.



# 5. Annual results

Notable surface water and groundwater results for 2023 are highlighted in the sub-sections below (5.1 and 5.2, respectively). Further detail can be found in the respective quarterly reports.

Long-term analyte trends are assessed using time series graphs for data from December 2015 to December 2023. Graphs have only been prepared for analytes that have exceeded respective adopted criteria within this period (Appendix B). Copies of field sheets for the 2023 monitoring period are provided in Appendix F. Photographs taken over the 2023 monitoring period are provided in Appendix H.

## 5.1 Surface water

A complete annual record of field parameters and analytical results for surface water is presented in Appendix A, Table 1 (basins) and Table 2 (surface water locations). The following key findings were noted in 2023:

- Basin 2 remained dry throughout 2023. Basin 3 was dry at the end of Q3 (September 2023) through all of Q4. No flow was observed at SW locations SW1 to SW11 in 2023 except during the February 2023 rainfall event.
- Field pH ranged between 5.9 to 7.9 pH units, at all locations except for SW2, which recorded a pH value of 6.4 which was slightly below the adopted criteria during the 24 February rainfall event. All field and lab pH values were within historical range during 2023.
- Field turbidity exceeded the adopted assessment criteria at Basin 1, SW1, SW2, SW7 and SW9 during select Q1 monitoring events, however remained within historical ranges.
- Laboratory turbidity and total suspended solid (TSS) concentrations varied without trend throughout 2023 at several locations and intermittently exceeded assessment criteria (noting that SW locations SW1 to SW11 were only monitored during the February 2023 rainfall event). All detections were consistent with historical records with the exception of TSS at Basin 3 during Q2 and SW9 and SW11 during the February rainfall event, and turbidity at SW2 during the February rainfall event. The presence of livestock proximal to sampling points and the influence of rainfall are considered possible causes for the fluctuation (e.g., concentration spikes occurring following significant rainfall).
- Most metal concentrations were consistent with historical records. Spike exceedances of several heavy metals at Basin 3 occurred throughout 2023 and several SW locations during the February 2023 rainfall event. Concentrations were largely within historical ranges with the exception of nickel at SW2, nickel and zinc at SW4 and SW11, iron and nickel at Basin 3, and arsenic at SW7 which recorded their highest historical values. Iron concentrations at Basin 3 have been increasing since Q1 2023, however this location was dry during Q3 and Q4 and not able to be sampled. These exceedances are likely related to and the increase in turbidity.
- Nitrogen concentrations were generally below the DCA/DCB except for isolated spikes recorded at Basin 1 (Q1), Basin 3 (February rainfall event and Q2) and SW7 (February rainfall event). These exceedances typically coincided with increased rainfall observed during February, with the exception of Basin 3, which had the highest concentration observed since July 2021 during the Q2 event. The previous exceedances observed in 2021 to 2022 at Basin 1 decreased in 2023 following the Q1 spike, with concentrations below the DCB during the remaining 2023 events.
- Concentrations of BTEXN and PAHs<sup>3</sup> were below the laboratory LOR at all surface water monitoring locations during 2023, consistent with historical data.

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<sup>3</sup> Noting LORs for Anthracene, Benzo(a) pyrene and Phenanthrene exceed the assessment criteria and no definitive conclusion can be made regarding compliance levels of these analytes.

- Some detections of TRH fractions were noted at Basin 1 and Basin 3, consistent with historical intermittent detections. Concentrations of TRH C<sub>6</sub>-C<sub>36</sub> exceeded the adopted assessment criteria (DCB) during the Q1 and Q2 events at Basin 3. Exceedances of the DCB have been previously observed at this location, however concentrations during Q2 2023 exceeded historical highs. As Basin 3 has been dry since August 2023, a concentration trend has not been able to be determined, however will be further evaluated in 2024 if able to be sampled, to likely include additional TRH silica gel cleanup analysis.
- Thermotolerant coliform concentrations exceeded historical highs and the adopted assessment criteria (DCA/DCB) at Basin 1, SW1, SW2, SW4A, SW6 and SW11. Elevated concentrations above the DCA/DCB were also recorded at Basin 3 during the Q1 sampling event and at most remaining surface water locations during the February rainfall event. These higher concentrations may reflect influence from adjacent agricultural areas (i.e., faecal matter from livestock).

## 5.2 Groundwater

A complete annual record of field parameters and analytical results for groundwater is presented in Table 3, Appendix A. The following key findings and results were noted during the groundwater monitoring program completed during 2023:

- Groundwater levels remained within historical ranges over 2023, with ongoing decreases noted in Q3 and Q4 (a down trend within historical ranges).
- Field pH ranged 5.1 to 7.3 during 2023. pH at MW02 remained below the adopted criteria (DCC) throughout 2023, consistent with historical records.
- Field electrical conductivity exceeded the adopted assessment criteria at MW01R (Q4 only) and MW101R and MW307R throughout 2023. Concentrations were within historical ranges except at MW101R which recorded a new high in Q4. Concentrations have been generally increasing since early to mid-2022 at locations MW101R, MW301R, and MW307R.
- Lab turbidity and TSS concentrations were below the DCC at all locations, except for an isolated spike within the historical range at MW101R in Q3, and an isolated spike in field turbidity, outside the historical range at MW01R in Q2. Levels returned to historical ranges thereafter.
- Exceedances of the DCC for aluminium, arsenic, cadmium, chromium, copper, and lead were observed at select monitoring wells throughout 2023. Heavy metal concentrations remained low, stable and within historical ranges, with the exception of aluminium at MW101R which was above the DCC and historical levels in Q4, arsenic which exceeded historical highs in Q1 at MW106R (although levels did drop throughout 2023) and cadmium at MW307R which exceeded criteria and historical highs in Q4. These analytes will be monitored in 2024 for any possible increasing trends.
- Nitrogen concentrations at MW307R exceeded DCC criteria throughout 2023 however remained within historical ranges. Concentrations at MW307R increased in Q3 and Q4 but remain below the maximum concentration observed in Q3 2022. A spike in concentration to above the DCC occurred in MW106R during Q3, however this was within historical range and decreased below the DCC in Q4.
- Concentrations of BTEXN and PAHs were reported below LORs at all groundwater monitoring locations during 2023, consistent with historical records.
- TRH (C<sub>10</sub>-C<sub>36</sub>) concentrations were below the DCC at all groundwater monitoring locations in 2023 with the exception of a spike exceedance at MW01R during Q2 that was above historical ranges. The spike exceedance is not indicative of any trend and TRH concentrations decreased below criteria during Q3 and <LOR during Q4.
- Thermotolerant coliform concentrations were similar to 2022, with the exception of some isolated spikes above the historical ranges and DCC at MW108R (December), MW109 (December) and MW308R (March). The concentration in MW307R during Q1 also exceeded the DCC. All other detections were below assessment criteria over 2023 .

## 6. Compliance statement

All sampling was in accordance with requirements as outlined in the OSGWP. All analysis in 2023 was in accordance with OSGWP requirements except for:

- During the 24 February rainfall event, samples for thermotolerant (faecal) coliforms were not taken at surface water locations due to laboratory handling restrictions that would have resulted in analysis outside of holding times. Thermotolerant (faecal) coliforms were therefore sampled at the next opportunity (28 February). the rainfall event conducted on 24 February otherwise complied with conditions of sampling as soon as possible after a rainfall event.
- Field turbidity was not gauged during the November monthly event and Q4 as a result of equipment supplier issues at all well locations, and at select well locations during Q1 due to an equipment malfunction.
- SWL was unable to be obtained from MW308R during the December quarterly (Q4) as the probe was blocked by a down-hole.

### 6.1 Summary compliance during the monitoring period

Table 6.1 outlines the compliance monitoring activities completed in 2023, in accordance with the OSGMP requirements.

Table 6.1 Monitoring compliance 2023 summary

Implementation Action	Parameters	Frequency	Compliance
Surface water monitoring sites: SW1, SW2, SW3, SW4, SW4A, SW5, SW6, SW7, SW8, SW9, SW10, SW11	Field parameters <sup>2</sup>	Quarterly and rainfall events	<u>Yes</u>
	Laboratory analytes <sup>1</sup>	Quarterly and rainfall events	<u>Partial</u> <sup>3</sup>
Water quality monitoring of Basins 1 to 3	Field parameters <sup>2</sup>	Monthly	<u>Partial</u> <sup>4</sup> Field turbidity was not gauged in the November monthly and December quarterly events and at select wells during the March quarterly event.
	Laboratory analytes <sup>1</sup>	Quarterly and rainfall	<u>Partial</u> <sup>3</sup>
Groundwater monitoring wells: 101R, MW01R, MW02, MW101R, MW106R, MW108R, MW109, MW301R, MW302R (FD01 and FD02), MW307R, MW308R	Field parameters <sup>1</sup>	Quarterly	<u>Partial</u> <sup>4</sup>
	Laboratory analytes <sup>2</sup>	Quarterly	<u>Partial</u> <sup>3</sup>
	Groundwater depth and flow	Quarterly	<u>Partial</u> MW308R blocked preventing SWL gauging.

1 Laboratory analytes include all analytes listed in Table 3.1

2 Field parameters are temperature, pH, redox, electrical conductivity, dissolved oxygen, turbidity, sheen, and odour (visual check)

3 Thermotolerant (Faecal) Coliforms were sampled during the monthly event (28 February) not the rainfall response event (24 February) to achieve analysis within holding times.

4 Field turbidity was not gauged in the November monthly and December quarterly events as the incorrect WQM was supplied, and at select wells during the March quarterly event due to an equipment malfunction.

## **6.2 Review of monitoring program suitability**

Spatial coverage provided by the current surface and groundwater monitoring network is considered adequate for the purpose of the project objectives.

A review of groundwater elevation contours and inferred flow directions is recommended as standard industry practice. This should incorporate the collection of survey levels by an appropriate contractor. No further changes to the monitoring program are suggested at the time of reporting herein.

## **6.3 Future monitoring**

Ongoing compliance monitoring proposed for 2024 should remain consistent with the monitoring program completed during 2023, in accordance with Condition C19 (Table 1) outlined in the OSGMP.

## **6.4 Potential Work, Health & Safety (WHS) issues**

Prior to commencing monitoring activities at Hexham TSF, all GHD site personnel completed an online induction and site familiarisation as directed by Aurizon. No safety incidents occurred during the 2023 compliance monitoring. As such, no WHS workshops were required.

## 7. References

Aurizon (2021a) *Hexham TSF Environmental Management*, 14-PLA-004-HEX Aurizon Hexham TSF OEMP, dated 1 October 2021.

Aurizon (2021b) *Hexham TSF Operational Surface and Groundwater Monitoring Plan*, 14-PLA-0004-HEX OSGMP, dated 30 March 2021.

Australian and New Zealand Environmental Conservation Council (ANZECC & ARMCANZ 2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*.

Douglas Partners (2014) Report on Discharge Criteria Assessment, Proposed Long Term Train Support Facility, Woodlands Close Hexham. Project 39798.17.18 February 2014.

GHD (2023a) Aurizon Hexham Compliance Water Monitoring, Quarterly Water Monitoring – Q1 2023. 27 April 2023.

GHD (2023b) Aurizon Hexham Compliance Water Monitoring, Quarterly Water Monitoring – Q2 2023. 1 August 2023.

GHD (2023c) Aurizon Hexham Compliance Water Monitoring, Quarterly Water Monitoring – Q3 2023. 07 November 2023.

GHD (2024a) Aurizon Hexham Compliance Water Monitoring, Quarterly Water Monitoring – Q4 2023. 12 February 2024.

NEPC (2013) *National Environment Protection (Assessment of Site Contamination) Amended Measure (NEPM) No. 1 – Schedule B2, Guideline on Site Characterisation*.

Manly Hydraulics Laboratory (2023) Hexham Bridge (Station number 210448) Daily Rainfall data <http://www.mhl.nsw.gov.au/Site-210448>.

## 8. Limitations

This report: has been prepared by GHD for *Aurizon Operations Limited* and may only be used and relied on by *Aurizon Operations Limited* for the purpose agreed between GHD and *Aurizon Operations Limited* as set out in Section 1 of this report.

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

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared. Specifically, this report does not take into account the effects, implications, and consequences of or responses to COVID-19, which is a highly dynamic situation and rapidly changing. These effects, implications, consequences of and responses to COVID-19 may have a material effect on the opinions, conclusions, recommendations, assumptions, qualifications and limitations in this Report, and the entire Report must be re-examined and revisited in light of COVID-19. Where this Report is relied on or used without obtaining this further advice from GHD, to the maximum extent permitted by law, GHD disclaims all liability and responsibility to any person in connection with, arising from or in respect of this Report whether such liability arises in contract, tort (including negligence) or under statute.

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

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

# Appendices

# **Appendix A**

**Annual results summary tables**



Appendix A  
Table 1  
Basin Analytical Results - 2023

	Field Parameters						NA	Inorganics	Inorganics		
	pH (Field)	Electrical conductivity (field)	Dissolved Oxygen (Field)	Redox (Field)	Temperature (Field)	Turbidity (Field)	Naphthalene (value used in F2 calc)	pH (Lab)	Electrical conductivity (lab)	Turbidity	Total Suspended Solids
	pH units	µS/cm	mg/L	mV	°C	NTU	mg/L	pH units	µS/cm	NTU	mg/L
LOR	0.1	1	0.1	1	0.1	1	0.005	0.1	10	1	5
Category B (Wetlands) Discharge Locations 4, 5 and 6	5.5-8.5	6,000				50		5.5-8.5	6,000	50	40

Location	Date /Time	Field ID	Sample Type	Category											
Basin 1	16/01/2023	Basin 1	Normal	B	7.0	1313.0	0.4	-294.6	22.6	229.3	-	-	-	-	
	24/02/2023 & ^28/02/2023				7.0	663.0	0.7	-82.4	20.3	29.2	<0.01	7.7	640	5.3	20
	28/02/2023				7.3	850.0	0.7	-168.1	22.4	22.6	-	-	-	-	-
	22/03/2023				7.4	1179.0	0.1	-153.0	19.8	109.0	<0.01	7.5	1,100	86	220
	18/04/2023				7.4	1002	1.0	-165	16.7	29	-	-	-	-	-
	4/05/2023				6.8	962	1.1	-102	14.1	10	-	-	-	-	-
	27/06/2023				8.0	1169	2.0	-133	9.1	3	<0.01	8	1,600	1.6	5.6
	11/07/2023				7.7	1209	0.9	-79.0	9.5	2.1	-	-	-	-	-
	15/08/2023				7.3	1023	3.5	-86.8	13.4	6.3	-	-	-	-	-
	26/09/2023				7.6	1356	3.8	-114.8	14.7	6.8	<0.01	7.9	1,300	3.8	9.5
	14 Nov 2023				7.8	961	0.2	-159.8	21.8	-	-	-	-	-	-
	13 Dec 2023				7.3	1304	0.0	-280.0	23.0	-	<0.01	7.9	1,300	4.5	7.1
	Basin 3				16/01/2023	Basin 3			7.4	2486.0	1.1	-228.7	19.8	41.5	-
24/02/2023 & ^28/02/2023		7.2	1615.0	0.3	-117.6				19.6	11.0	<0.01	7.7	1,400	7.5	28
28/02/2023		7.5	1663.0	0.3	-173.1				22.2	37.5	-	-	-	-	-
22/03/2023		7.0	1901.0	0.3	-222.8				19.1	26.7	<0.01	7.6	1,800	11	33
18/04/2023		7.9	1471	1.0	-175				16.1	31	-	-	-	-	-
4/05/2023		6.9	1335	0.8	-61				13.6	32	-	-	-	-	-
27/06/2023		7.0	1647	3.3	-214				9.3	42	<0.01	7.6	1,400	15	800
11/07/2023		7.5	1670	1.1	-162.0				8.6	18.0	-	-	-	-	-
15/08/2023		7.2	1275	2.8	-169.7				11.7	5.5	-	-	-	-	-

Appendix A  
Table 1  
Basin Analytical Results - 2023

	Nutrients					Organic Indicators	Metals					
	Ammonia as N	Nitrogen (Total Oxidised) (as N)	Nitrate (as N)	Nitrite (as N)	Nitrogen (Total)	Kjeldahl Nitrogen Total	Phosphorus (Total)	BOD	Aluminium	Arsenic	Cadmium	Chromium (III+VI)
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOR	0.01	0.01	0.02	0.02	0.1	0.1	0.01	5	0.05	0.001	0.0001	0.001
Category B (Wetlands) Discharge Locations 4, 5 and 6					4	4	1.9	15	2.5	0.013	0.0002	0.002

Location	Date /Time	Field ID	Sample Type	Category	Ammonia as N	Nitrogen (Total Oxidised) (as N)	Nitrate (as N)	Nitrite (as N)	Nitrogen (Total)	Kjeldahl Nitrogen Total	Phosphorus (Total)	BOD	Aluminium	Arsenic	Cadmium	Chromium (III+VI)
Basin 1	16/01/2023	Basin 1	Normal	B	-	-	-	-	-	-	-	-	-	-	-	-
	24/02/2023 & ^28/02/2023				0.24	<0.05	-	-	2.3	2.3	0.59	<5	0.07	0.004	<0.0002	<0.001
	28/02/2023				-	-	-	-	-	-	-	-	-	-	-	-
	22/03/2023				0.09	<0.05	-	-	7.9	7.9	1.3	<5	0.4	0.003	<0.0002	<0.001
	18/04/2023				-	-	-	-	-	-	-	-	-	-	-	-
	4/05/2023				-	-	-	-	-	-	-	-	-	-	-	-
	27/06/2023				0.23	<0.05	<0.02	<0.02	0.4	0.4	0.47	<5	<0.05	0.002	<0.0002	<0.001
	11/07/2023				-	-	-	-	-	-	-	-	-	-	-	-
	15/08/2023				-	-	-	-	-	-	-	-	-	-	-	-
	26/09/2023				0.23	<0.05	0.03	<0.02	0.9	0.9	0.70	<50	<0.05	0.002	<0.0002	<0.001
	14 Nov 2023				-	-	-	-	-	-	-	-	-	-	-	-
	13 Dec 2023				0.25	0.32	0.32	<0.02	2.9	2.6	1.3	<10	<0.05	0.004	<0.0002	0.001
	Basin 3				16/01/2023	Basin 3			-	-	-	-	-	-	-	-
24/02/2023 & ^28/02/2023		1.8	0.84	-	-				5.84	5	1.5	6.6	0.21	0.004	<0.0002	<0.001
28/02/2023		-	-	-	-				-	-	-	-	-	-	-	-
22/03/2023		3	0.06	-	-				3.06	3	0.83	8.9	1.9	0.002	<0.0002	0.002
18/04/2023		-	-	-	-				-	-	-	-	-	-	-	-
4/05/2023		-	-	-	-				-	-	-	-	-	-	-	-
27/06/2023		2	<0.05	<0.02	<0.02				23	23	4.9	49	5.5	<0.001	<0.0002	0.002
11/07/2023		-	-	-	-				-	-	-	-	-	-	-	-
15/08/2023		-	-	-	-				-	-	-	-	-	-	-	-

Appendix A  
Table 1  
Basin Analytical Results - 2023

	Metals					BTEXN						
	Copper	Iron	Lead	Mercury	Nickel	Zinc	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
LOR	0.001	0.05	0.001	0.0001	0.001	0.005	1	1	1	1	2	3
Category B (Wetlands) Discharge Locations 4, 5 and 6	0.0026	1.3	0.0034	0.0006	0.011	0.019	950	180	80			625

Location	Date /Time	Field ID	Sample Type	Category	Copper	Iron	Lead	Mercury	Nickel	Zinc	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total			
Basin 1	16/01/2023	Basin 1	Normal	B	-	-	-	-	-	-	-	-	-	-	-	-			
	24/02/2023 & ^28/02/2023				0.002	0.17	<0.001	<0.0001	<0.001	0.007	<1	<1	<1	<1	<1	<2	<3		
	28/02/2023				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	22/03/2023				0.002	0.56	0.002	<0.0001	0.002	0.022	<1	<1	<1	<1	<1	<2	<3		
	18/04/2023				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	4/05/2023				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	27/06/2023				<0.001	0.05	<0.001	<0.0001	<0.001	<0.005	<1	<1	<1	<1	<1	<2	<3		
	11/07/2023				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15/08/2023				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	26/09/2023				<0.001	0.09	<0.001	<0.0001	<0.001	<0.005	<1	<1	<1	<1	<1	<2	<3		
	14 Nov 2023				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	13 Dec 2023				<0.001	0.05	<0.001	<0.0001	<0.001	<0.005	<1	<1	<1	<1	<1	<2	<3		
Basin 3	16/01/2023	Basin 3			-	-	-	-	-	-	-	-	-	-	-	-			
	24/02/2023 & ^28/02/2023				0.003	0.62	<0.001	<0.0001	0.032	0.057	<1	<1	<1	<1	<2	<3			
	28/02/2023				-	-	-	-	-	-	-	-	-	-	-	-	-		
	22/03/2023				<0.001	9	0.001	<0.0001	0.038	0.061	<1	<1	<1	<1	<2	<3			
	18/04/2023				-	-	-	-	-	-	-	-	-	-	-	-	-		
	4/05/2023				-	-	-	-	-	-	-	-	-	-	-	-	-		
	27/06/2023				<0.001	39	<0.001	<0.0001	0.14	0.1	<1	<1	<1	<1	<2	<3			
	11/07/2023				-	-	-	-	-	-	-	-	-	-	-	-	-		
15/08/2023	-	-	-	-	-	-	-	-	-	-	-	-	-						

	TRH - NEPM 2013			TRH - NEPM 2013				TRH - NEPM 1999				
	BTEX (Sum of Total) - Lab Calc	Naphthalene	F1 (C6-C10 minus BTEX)	C6-C10 Fraction	F2 (>C10-C16 minus Naphthalene)	>C10-C16 Fraction	F3 (>C16-C34 Fraction)	F4 (>C34-C40 Fraction)	>C10-C40 (Sum of Total)	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
LOR	1	1	20	20	50	50	100	100	100	20	50	100
Category B (Wetlands) Discharge Locations 4, 5 and 6		50										

Location	Date /Time	Field ID	Sample Type	Category	BTEX (Sum of Total) - Lab Calc	Naphthalene	F1 (C6-C10 minus BTEX)	C6-C10 Fraction	F2 (>C10-C16 minus Naphthalene)	>C10-C16 Fraction	F3 (>C16-C34 Fraction)	F4 (>C34-C40 Fraction)	>C10-C40 (Sum of Total)	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction
Basin 1	16/01/2023	Basin 1	Normal	B	-	-	-	-	-	-	-	-	-	-	-	-
	24/02/2023 & ^28/02/2023				<1	<20	<20	<50	<50	<100	<100	<100	<20	<50	<100	
	28/02/2023				-	-	-	-	-	-	-	-	-	-	-	
	22/03/2023				<1	60	60	<50	<50	200	<100	200	30	<50	100	
	18/04/2023				-	-	-	-	-	-	-	-	-	-	-	
	4/05/2023				-	-	-	-	-	-	-	-	-	-	-	
	27/06/2023				<1	<20	<20	<50	<50	<100	<100	<100	<20	<50	<100	
	11/07/2023				-	-	-	-	-	-	-	-	-	-	-	
	15/08/2023				-	-	-	-	-	-	-	-	-	-	-	
	26/09/2023				<1	<10	<20	<20	<50	<100	<100	<100	<20	<50	<100	
	14 Nov 2023				-	-	-	-	-	-	-	-	-	-	-	
	13 Dec 2023				<1	<20	<20	<50	<50	<100	<100	<100	<20	<50	<100	
	Basin 3				16/01/2023	Basin 3	Normal	B	-	-	-	-	-	-	-	-
24/02/2023 & ^28/02/2023		<1	<20	<20	50				50	100	<100	150	<20	<50	100	
28/02/2023		-	-	-	-				-	-	-	-	-	-	-	
22/03/2023		<1	120	120	<50				<50	200	<100	200	90	<50	200	
18/04/2023		-	-	-	-				-	-	-	-	-	-	-	
4/05/2023		-	-	-	-				-	-	-	-	-	-	-	
27/06/2023		<1	<20	<20	70				70	2,700	2,300	5,070	<20	<50	2,100	
11/07/2023		-	-	-	-				-	-	-	-	-	-	-	
15/08/2023		-	-	-	-				-	-	-	-	-	-	-	

Appendix A  
Table 1  
Basin Analytical Results - 2023

	PAHs - standard 16							
	C29-C36 Fraction	C10-C36 (Sum of Total)	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo[b+g]fluoranthene
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
LOR	50	50	1	1	1	1	0.5	1
Category B (Wetlands) Discharge Locations 4, 5 and 6		150			0.6		0.1	

Location	Date /Time	Field ID	Sample Type	Category									
Basin 1	16/01/2023	Basin 1	Normal	B	-	-	-	-	-	-	-	-	-
	24/02/2023 & ^28/02/2023				<100		<1	<1	<1	<1	<1	<1	<1
	28/02/2023				-	-	-	-	-	-	-	-	-
	22/03/2023				<100	130	<1	<1	<1	<1	<1	<1	<1
	18/04/2023				-	-	-	-	-	-	-	-	-
	4/05/2023				-	-	-	-	-	-	-	-	-
	27/06/2023				<100	<110	<1	<1	<1	<1	<1	<1	<1
	11/07/2023				-	-	-	-	-	-	-	-	-
	15/08/2023				-	-	-	-	-	-	-	-	-
	26/09/2023				<100	<110	<1	<1	<1	<1	<1	<1	<1
	14 Nov 2023				-	-	-	-	-	-	-	-	-
	13 Dec 2023				<100	<110	<1	<1	<1	<1	<1	<1	<1
	Basin 3				16/01/2023	Basin 3			-	-	-	-	-
24/02/2023 & ^28/02/2023		<100	110	<1	<1				<1	<1	<1	<1	
28/02/2023		-	-	-	-				-	-	-	-	
22/03/2023		<100	290	<1	<1				<1	<1	<1	<1	
18/04/2023		-	-	-	-				-	-	-	-	
4/05/2023		-	-	-	-				-	-	-	-	
27/06/2023		1,200	3,310	<1	<1				<1	<1	<1	<1	
11/07/2023		-	-	-	-				-	-	-	-	
15/08/2023		-	-	-	-				-	-	-	-	

	PAHs - standard 16										Microbes
	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Phenanthrene	Pyrene	PAHs (Sum of total) - Lab calc	
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
LOR	1	1	1	1	1	1	1	1	1	0.5	10
Category B (Wetlands) Discharge Locations 4, 5 and 6					1			0.6		1.5	500

Location	Date /Time	Field ID	Sample Type	Category	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Phenanthrene	Pyrene	PAHs (Sum of total) - Lab calc	Microbes		
Basin 1	16/01/2023	Basin 1	Normal	B	-	-	-	-	-	-	-	-	-	-	-		
	24/02/2023 & ^28/02/2023				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	830*	
	28/02/2023				-	-	-	-	-	-	-	-	-	-	-	-	-
	22/03/2023				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	18450
	18/04/2023				-	-	-	-	-	-	-	-	-	-	-	-	-
	4/05/2023				-	-	-	-	-	-	-	-	-	-	-	-	-
	27/06/2023				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	37
	11/07/2023				-	-	-	-	-	-	-	-	-	-	-	-	-
	15/08/2023				-	-	-	-	-	-	-	-	-	-	-	-	-
	26/09/2023				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	91
	14 Nov 2023				-	-	-	-	-	-	-	-	-	-	-	-	-
	13 Dec 2023				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	30
	Basin 3				16/01/2023	Basin 3	Normal	B	-	-	-	-	-	-	-	-	-
24/02/2023 & ^28/02/2023		<1	<1	<1	<1				<1	<1	<1	<1	<1	<1	<1	727*	
28/02/2023		-	-	-	-				-	-	-	-	-	-	-	-	
22/03/2023		<1	<1	<1	<1				<1	<1	<1	<1	<1	<1	<1	910	
18/04/2023		-	-	-	-				-	-	-	-	-	-	-	-	
4/05/2023		-	-	-	-				-	-	-	-	-	-	-	-	
27/06/2023		<1	<1	<1	<1				<1	<1	<1	<1	<1	<1	<1	<1	470
11/07/2023		-	-	-	-				-	-	-	-	-	-	-	-	-
15/08/2023	-	-	-	-	-	-	-	-	-	-	-	-	-				

As the discharge criteria value for TRH is for the sum of total C6-C36, the C6-C9 concentration was added to the laboratory provided C10-C36 concentration for comparison. When the C6-C9 concentration was below SWL was unable to be obtained from MW308R during

\* Thermotolerant (Faecal) Coliforms only were sampled on 28/02/2023 alongside the routine February monthly as the holding ti

Appendix A  
 Table 3  
 Groundwater Analytical Results - 2023

Misc.	Field Parameters					Field Parameters	NA	Inorganics				Nutrients				Organic Indicators				
	S/ML	pH (Field)	Electrical conductivity (Field)	Dissolved Oxygen (Field)	Redox (Field)			Temperature (Field)	Turbidity (Field)	Naphthalene (value used in Calc)	pH (Lab)	Electrical conductivity (lab)	Turbidity	Total Suspended Solids	Ammonia as N	Nitrogen (Total Oxidised) (as N)	Nitrate (as N)	Nitrite (as N)	Nitrogen (Total)	Kjeldahl Nitrogen Total
mbtoc	pH units	µS/cm	mg/L	mV	°C	NTU	mg/L	pH units	µS/cm	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOR	0	0.1	1	0.1	0.1	1	0.005	0.1	10	1	5	0.01	0.01	0.02	0.02	0.02	0.1	0.1	0.01	5
Category C (Infiltrate)		5.5-8.5	20,500			1,200		5.5-8.5	20,500	1,200	650					12	12	14.5	30	

Location Code	Date /Time	Field ID	Sample Type	Category
101R	22/03/2023	101R	Normal	C
101R	27/06/2023	101R	Normal	C
101R	26/09/2023	101R	Normal	C
101R	13/12/2023	101R	Normal	C
MW01R	22/03/2023	MW01R	Normal	C
MW01R	27/06/2023	MW01R	Normal	C
MW01R	26/09/2023	MW01R	Normal	C
MW01R	26/09/2023	FD01	Intralab D	C
MW01R	26/09/2023	FD02	Interlab D	C
MW01R	18/12/2023	MW01R	Normal	C
MW02	22/03/2023	MW02	Normal	C
MW02	27/06/2023	MW02	Normal	C
MW02	26/09/2023	MW02	Normal	C
MW02	18/12/2023	MW02	Normal	C
MW101R	22/03/2023	MW101R	Normal	C
MW101R	27/06/2023	MW101R	Normal	C
MW101R	26/09/2023	MW101R	Normal	C
MW101R	18/12/2023	MW101R	Normal	C
MW106R	22/03/2023	MW106R	Normal	C
MW106R	27/06/2023	MW106R	Normal	C
MW106R	26/09/2023	MW106R	Normal	C
MW106R	13/12/2023	MW106R	Normal	C
MW108R	22/03/2023	MW108R	Normal	C
MW108R	27/06/2023	MW108R	Normal	C
MW108R	26/09/2023	MW108R	Normal	C
MW108R	18/12/2023	MW108R	Normal	C
MW109	22/03/2023	MW109	Normal	C
MW109	27/06/2023	MW109	Normal	C
MW109	26/09/2023	MW109	Normal	C
MW109	13/12/2023	MW109	Normal	C
MW301R	22/03/2023	MW301R	Normal	C
MW301R	27/06/2023	MW301R	Normal	C
MW301R	26/09/2023	MW301R	Normal	C
MW301R	13/12/2023	MW301R	Normal	C
MW302R	22/03/2023	MW302R	Normal	C
MW302R	22/03/2023	FD01	Field D	C
MW302R	22/03/2023	FD02	Interlab D	C
MW302R	27/06/2023	MW302R	Normal	C
MW302R	27/06/2023	FD01	Field D	C
MW302R	27/06/2023	FD02	Interlab D	C
MW302R	26/09/2023	MW302R	Normal	C
MW302R	13/12/2023	MW302R	Normal	C
MW302R	13/12/2023	FD01	Field D	C
MW302R	13/12/2023	FD02	Interlab D	C
MW307R	22/03/2023	MW307R	Normal	C
MW307R	27/06/2023	MW307R	Normal	C
MW307R	26/09/2023	MW307R	Normal	C
MW307R	18/12/2023	MW307R	Normal	C
MW308R	22/03/2023	MW308R	Normal	C
MW308R	27/06/2023	MW308R	Normal	C
MW308R	26/09/2023	MW308R	Normal	C
MW308R	18/12/2023	MW308R	Normal	C







	PAHs - standard 16							Microbes
	Fluoranthene	Fluorene	Indeno(1,2,3-c)pyrene	Phenanthrene	Pyrene	PAHs (Sum of total) - Lab Calc	Total 8 PAHs (as BAP TEQ)/zero LOR) - Lab Calc	
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	cfu/100mL
LOR	1	1	1	1	1	0.5	0.5	10
Category C (Infiltrate)	1.5	1	1	1.5	1	20	0.5	2,000

Location Code	Date /Time	Field ID	Sample Type	Category									
101R	22/03/2023	101R	Normal	C	<1	<1	<1	<1	<1	<1	-	<1	<1
101R	27/06/2023	101R	Normal		<1	<1	<1	<1	<1	<1	-	<1	<1
101R	26/09/2023	101R	Normal		<1	<1	<1	<1	<1	<1	-	<1	<1
101R	13/12/2023	101R	Normal		<1	<1	<1	<1	<1	<1	-	<1	<1
MW01R	22/03/2023	MW01R	Normal		<1	<1	<1	<1	<1	<1	-	<1	<1
MW01R	27/06/2023	MW01R	Normal		<1	<1	<1	<1	<1	<1	-	<1	<1
MW01R	26/09/2023	MW01R	Normal		<1	<1	<1	<1	<1	<1	-	<1	<1
	26/09/2023	FD01	Intralab D		<1	<1	<1	<1	<1	<1	-	-	-
	26/09/2023	FD02	Interlab D		<1	<1	<1	<1	<1	<0.5	-	-	-
MW01R	18/12/2023	MW01R	Normal		<1	<1	<1	<1	<1	<1	-	<1	<1
MW02	22/03/2023	MW02	Normal		<1	<1	<1	<1	<1	<1	-	100	<1
MW02	27/06/2023	MW02	Normal		<1	<1	<1	<1	<1	<1	-	<1	<1
MW02	26/09/2023	MW02	Normal		<1	<1	<1	<1	<1	<1	-	<1	<1
MW02	18/12/2023	MW02	Normal		<1	<1	<1	<1	<1	<1	-	1	<1
MW101R	22/03/2023	MW101R	Normal		<1	<1	<1	<1	<1	<1	-	<1	<1
MW101R	27/06/2023	MW101R	Normal		<1	<1	<1	<1	<1	<1	-	7	<1
MW101R	26/09/2023	MW101R	Normal		<1	<1	<1	<1	<1	<1	-	<1	<1
MW101R	18/12/2023	MW101R	Normal		<1	<1	<1	<1	<1	<1	-	2	<1
MW106R	22/03/2023	MW106R	Normal		<1	<1	<1	<1	<1	<1	-	<1	<1
MW106R	27/06/2023	MW106R	Normal		<1	<1	<1	<1	<1	<1	-	<1	<1
MW106R	26/09/2023	MW106R	Normal		<1	<1	<1	<1	<1	<1	-	<1	<1
MW106R	13/12/2023	MW106R	Normal		<1	<1	<1	<1	<1	<1	-	<1	<1
MW108R	22/03/2023	MW108R	Normal		<1	<1	<1	<1	<1	<1	-	120	<1
MW108R	27/06/2023	MW108R	Normal		<1	<1	<1	<1	<1	<1	-	<1	<1
MW108R	26/09/2023	MW108R	Normal		<1	<1	<1	<1	<1	<1	-	<1	<1
MW108R	18/12/2023	MW108R	Normal		<1	<1	<1	<1	<1	<1	-	6,000	<1
MW109	22/03/2023	MW109	Normal		<1	<1	<1	<1	<1	<1	-	310	<1
MW109	27/06/2023	MW109	Normal		<1	<1	<1	<1	<1	<1	-	<1	<1
MW109	26/09/2023	MW109	Normal		-	-	-	-	-	-	-	-	-
MW109	13/12/2023	MW109	Normal		<1	<1	<1	<1	<1	<1	-	3,600	<1
MW301R	22/03/2023	MW301R	Normal		<1	<1	<1	<1	<1	<1	-	100	<1
MW301R	27/06/2023	MW301R	Normal		<1	<1	<1	<1	<1	<1	-	13	<1
MW301R	26/09/2023	MW301R	Normal		<1	<1	<1	<1	<1	<1	-	<1	<1
MW301R	13/12/2023	MW301R	Normal		<1	<1	<1	<1	<1	<1	-	8	<1
MW302R	22/03/2023	MW302R	Normal		<1	<1	<1	<1	<1	<1	-	900	<1
	22/03/2023	FD01	Field D		<1	<1	<1	<1	<1	<1	-	-	-
	22/03/2023	FD02	Interlab D		<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	-	<0.5	-
MW302R	27/06/2023	MW302R	Normal		<1	<1	<1	<1	<1	<1	-	20	<1
	27/06/2023	FD01	Field D		<1	<1	<1	<1	<1	<1	-	-	-
	27/06/2023	FD02	Interlab D		<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	-	<0.5	-
MW302R	26/09/2023	MW302R	Normal		<1	<1	<1	<1	<1	<1	-	<1	<1
MW302R	13/12/2023	MW302R	Normal		<1	<1	<1	<1	<1	<1	-	2	<1
	13/12/2023	FD01	Field D		<1	<1	<1	<1	<1	<1	-	-	-
	13/12/2023	FD02	Interlab D		<1	<1	<1	<1	<1	<0.5	-	-	-
MW307R	22/03/2023	MW307R	Normal		<1	<1	<1	<1	<1	<1	-	2650	<1
MW307R	27/06/2023	MW307R	Normal		<1	<1	<1	<1	<1	<1	-	<1	<1
MW307R	26/09/2023	MW307R	Normal		<1	<1	<1	<1	<1	<1	-	<1	<1
MW307R	18/12/2023	MW307R	Normal		<1	<1	<1	<1	<1	<1	-	506	<1
MW308R	22/03/2023	MW308R	Normal		<1	<1	<1	<1	<1	<1	-	14700	<1
MW308R	27/06/2023	MW308R	Normal		<1	<1	<1	<1	<1	<1	-	<1	<1
MW308R	26/09/2023	MW308R	Normal		<1	<1	<1	<1	<1	<1	-	14	<1
MW308R	18/12/2023	MW308R	Normal		<1	<1	<1	<1	<1	<1	-	6	<1

1 The received ProDSS was missing the flow cell - field turbidity was not taken. Remaining field parameters taken using standard WQM  
2 Thermotolerant (Faecal) Coliforms only were sampled on 26/02/2023 alongside the routine February monthly as the holding time was missed.  
3 The LORs for the interlab duplicate FD02 during the march quarterly were 2 µg/L for toluene, ethylbenzene, and xylene (o) and xylene (m & p)  
As the discharge criteria value for TRH is for the sum of total C6-C36, the C6-C9 concentration was added to the laboratory provided C10-C36 concentration for comparison. When the C6-C9 concentration was below SWL was unable to be obtained from MW308R during

Appendix A  
Table 2  
Surfacewater Analytical Results - 2023

	Field Parameters						NA
	pH (Field)	Electrical conductivity (field)	Dissolved Oxygen (Field)	Redox (Field)	Temperature (Field)	Turbidity (Field)	Naphthalene (value used in F2 calc)
	pH units	µS/cm	mg/L	mV	°C	NTU	mg/L
LOR	0.1	1	0.1	1	0.1	1	0.005
Category A (Hunter River) Discharge Locations 1, 2 and 3	6.5-8.5	40,000				60	
Category B (Wetlands) Discharge Locations 4, 5 and 6	5.5-8.5	6,000				50	

Location Code	Date /Time	Field ID	Sample Type	Category							
SW1	24/02/2023 & ^28/02/2023	SW1	Normal	A	7.0	3409.0	4.2	29.1	23.0	245.7	<0.01
SW2		SW2	Normal	A	6.4	3027.0	2.4	44.1	21.9	92.8	<0.01
SW3		SW3	Normal	A	6.6	1394.0	3.3	45.2	21.6	31.6	<0.01
SW4		SW4	Normal	B	6.0	3252.0	1.7	53.9	19.8	30.0	<0.01
SW4A		SW4A	Normal	B	6.0	4085.0	1.5	28.4	20.0	6.7	<0.01
SW5		SW5	Normal	B	5.9	1373.0	2.1	19.5	20.4	26.3	<0.01
SW6		SW6	Normal	B	6.1	1420.0	1.8	43.9	20.2	12.8	<0.01
SW7		SW7	Normal	B	5.9	1878.0	0.2	-59.6	20.5	89.6	<0.01
SW9		SW9	Normal	A	6.9	28200.0	4.3	-30.0	23.7	73.5	<0.01
SW11		SW11	Normal	A	6.6	3470.0	2.2	27.1	22.0	27.9	<0.01

Appendix A  
Table 2  
Surfacewater Analytical Results - 2023

	Inorganics				Nutrients		
	pH (Lab)	Electrical conductivity (lab)	Turbidity	Total Suspended Solids	Ammonia as N	Nitrogen (Total Oxidised) (as N)	Nitrogen (Total)
	pH units	µS/cm	NTU	mg/L	mg/L	mg/L	mg/L
LOR	0.1	10	1	5	0.01	0.01	0.1
Category A (Hunter River) Discharge Locations 1, 2 and 3	6.5-8.5	40,000	60	50			10
Category B (Wetlands) Discharge Locations 4, 5 and 6	5.5-8.5	6,000	50	40			4

Location Code	Date /Time	Field ID	Sample Type	Category							
SW1	24/02/2023 & ^28/02/2023	SW1	Normal	A	7.4	2,800	150	91	0.09	1.2	2.9
SW2		SW2	Normal	A	7.3	2,600	57	90	0.74	0.7	3.4
SW3		SW3	Normal	A	7.3	1,200	26	42	1.1	0.17	3.77
SW4		SW4	Normal	B	6.5	2,400	8.8	8.6	0.36	0.09	1.69
SW4A		SW4A	Normal	B	7.1	3,000	20	38	0.04	<0.05	1.6
SW5		SW5	Normal	B	6.7	1,200	160	150	0.14	0.12	1.22
SW6		SW6	Normal	B	6.9	1,300	14	35	<0.01	<0.05	0.6
SW7		SW7	Normal	B	3.7	1,400	320	210	1.2	3.2	8.7
SW9		SW9	Normal	A	7.5	25,000	15	190	0.31	0.48	1.08
SW11		SW11	Normal	A	7.1	2,800	22	430	0.8	0.68	3.38

Appendix A  
Table 2  
Surfacewater Analytical Results - 2023

	Organic Indicators			Metals			
	Kjeldahl Nitrogen Total	Phosphorus (Total)	BOD	Aluminium	Arsenic	Cadmium	Chromium (III+VI)
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOR	0.1	0.01	5	0.05	0.001	0.0001	0.001
Category A (Hunter River) Discharge Locations 1, 2 and 3	8	2.75	40	2.5	0.013	0.0002	0.004
Category B (Wetlands) Discharge Locations 4, 5 and 6	4	1.9	15	2.5	0.013	0.0002	0.002

Location Code	Date /Time	Field ID	Sample Type	Category							
SW1	24/02/2023 & ^28/02/2023	SW1	Normal	A	1.7	0.18	61	1.7	0.011	<0.0002	0.002
SW2		SW2	Normal	A	2.7	0.17	<5	1.1	0.002	<0.0002	0.002
SW3		SW3	Normal	A	3.6	0.77	<5	0.93	0.003	<0.0002	<0.001
SW4		SW4	Normal	B	1.6	0.17	<5	0.35	<0.001	<0.0002	<0.001
SW4A		SW4A	Normal	B	1.6	0.95	<5	0.08	<0.001	<0.0002	<0.001
SW5		SW5	Normal	B	1.1	1.7	5.2	3.7	0.008	0.0007	0.001
SW6		SW6	Normal	B	0.6	0.17	<5	0.15	<0.001	<0.0002	<0.001
SW7		SW7	Normal	B	5.5	0.58	41	2.4	0.021	0.0004	0.002
SW9		SW9	Normal	A	0.6	0.07	<5	0.4	0.001	<0.0002	0.001
SW11		SW11	Normal	A	2.7	0.22	<5	1.8	0.002	<0.0002	0.003

Appendix A  
Table 2  
Surfacewater Analytical Results - 2023

	Metals					
	Copper	Iron	Lead	Mercury	Nickel	Zinc
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOR	0.001	0.05	0.001	0.0001	0.001	0.005
Category A (Hunter River) Discharge Locations 1, 2 and 3	0.0045	35	0.0044	0.0006	0.017	0.054
Category B (Wetlands) Discharge Locations 4, 5 and 6	0.0026	1.3	0.0034	0.0006	0.011	0.019

Location Code	Date /Time	Field ID	Sample Type	Category	Copper	Iron	Lead	Mercury	Nickel	Zinc
SW1	24/02/2023 & ^28/02/2023	SW1	Normal	A	0.015	2.5	0.013	<0.0001	0.011	0.053
SW2		SW2	Normal	A	0.004	2	0.001	<0.0001	0.041	0.12
SW3		SW3	Normal	A	0.004	1.8	0.001	<0.0001	0.012	0.052
SW4		SW4	Normal	B	0.005	4.1	<0.001	<0.0001	0.035	0.14
SW4A		SW4A	Normal	B	0.001	3.9	<0.001	<0.0001	0.011	0.037
SW5		SW5	Normal	B	0.007	32	0.002	<0.0001	0.12	0.38
SW6		SW6	Normal	B	0.002	2	<0.001	<0.0001	0.03	0.12
SW7		SW7	Normal	B	0.003	180	0.002	<0.0001	0.079	0.29
SW9		SW9	Normal	A	0.003	2.8	<0.001	<0.0001	0.002	0.013
SW11		SW11	Normal	A	0.005	3.2	0.001	<0.0001	0.037	0.079

	BTEXN						TRH - NEPM 2013	
	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	Naphthalene	F1 (C6-C10 minus BTEX)
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
LOR	1	1	1	1	2	3	1	20
Category A (Hunter River) Discharge Locations 1, 2 and 3	950	180	80			625	50	
Category B (Wetlands) Discharge Locations 4, 5 and 6	950	180	80			625	50	

Location Code	Date /Time	Field ID	Sample Type	Category								
SW1	24/02/2023 & ^28/02/2023	SW1	Normal	A	<1	<1	<1	<1	<2	<3	<1	<20
SW2		SW2	Normal	A	<1	<1	<1	<1	<2	<3	<1	<20
SW3		SW3	Normal	A	<1	<1	<1	<1	<2	<3	<1	<20
SW4		SW4	Normal	B	<1	<1	<1	<1	<2	<3	<1	<20
SW4A		SW4A	Normal	B	<1	<1	<1	<1	<2	<3	<1	<20
SW5		SW5	Normal	B	<1	<1	<1	<1	<2	<3	<1	<20
SW6		SW6	Normal	B	<1	<1	<1	<1	<2	<3	<1	<20
SW7		SW7	Normal	B	<1	<1	<1	<1	<2	<3	<1	<20
SW9		SW9	Normal	A	<1	<1	<1	<1	<2	<3	<1	<20
SW11		SW11	Normal	A	<1	<1	<1	<1	<2	<3	<1	<20

TRH - NEPM 2013									
C6-C10 Fraction	F2 (>C10-C16 minus Naphthalene)	>C10-C16 Fraction	F3 (>C16-C34 Fraction)	F4 (>C34-C40 Fraction)	>C10-C40 (Sum of Total)	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	
µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
LOR	20	50	50	100	100	100	20	50	100
Category A (Hunter River) Discharge Locations 1, 2 and 3									
Category B (Wetlands) Discharge Locations 4, 5 and 6									

Location Code	Date /Time	Field ID	Sample Type	Category									
SW1	24/02/2023 & ^28/02/2023	SW1	Normal	A	<20	<50	<50	<100	<100	<100	<20	<50	<100
SW2		SW2	Normal	A	<20	<50	<50	<100	<100	<100	<20	<50	<100
SW3		SW3	Normal	A	<20	<50	<50	<100	<100	<100	<20	<50	<100
SW4		SW4	Normal	B	<20	<50	<50	<100	<100	<100	<20	<50	<100
SW4A		SW4A	Normal	B	<20	<50	<50	<100	<100	<100	<20	<50	<100
SW5		SW5	Normal	B	<20	<50	<50	<100	<100	<100	<20	<50	<100
SW6		SW6	Normal	B	<20	<50	<50	<100	<100	<100	<20	<50	<100
SW7		SW7	Normal	B	<20	<50	<50	<100	<100	<100	<20	<50	<100
SW9		SW9	Normal	A	<20	<50	<50	<100	<100	<100	<20	<50	<100
SW11		SW11	Normal	A	<20	<50	<50	<100	<100	<100	<20	<50	<100



PAHs - standard 16									
	C29-C36 Fraction	C10-C36 (Sum of Total)	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo[b+g]fluoranthene	Benzo(k)fluoranthene
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
LOR	50	50	1	1	1	1	0.5	1	1
Category A (Hunter River) Discharge Locations 1, 2 and 3		150			0.6		0.6		
Category B (Wetlands) Discharge Locations 4, 5 and 6		150			0.6		0.1		

Location Code	Date /Time	Field ID	Sample Type	Category									
SW1	24/02/2023 & ^28/02/2023	SW1	Normal	A	<100	<110	<1	<1	<1	<1	<1	<1	<1
SW2		SW2	Normal	A	<100	<110	<1	<1	<1	<1	<1	<1	<1
SW3		SW3	Normal	A	<100	<110	<1	<1	<1	<1	<1	<1	<1
SW4		SW4	Normal	B	<100	<110	<1	<1	<1	<1	<1	<1	<1
SW4A		SW4A	Normal	B	<100	<110	<1	<1	<1	<1	<1	<1	<1
SW5		SW5	Normal	B	<100	<110	<1	<1	<1	<1	<1	<1	<1
SW6		SW6	Normal	B	<100	<110	<1	<1	<1	<1	<1	<1	<1
SW7		SW7	Normal	B	<100	<110	<1	<1	<1	<1	<1	<1	<1
SW9		SW9	Normal	A	<100	<110	<1	<1	<1	<1	<1	<1	<1
SW11		SW11	Normal	A	<100	<110	<1	<1	<1	<1	<1	<1	<1

	PAHs - standard 16									Microbes
	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Phenanthrene	Pyrene	PAHs (Sum of total) - Lab calc	Thermotolerant (Faecal) Coliforms
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	cfu/100mL
LOR	1	1	1	1	1	1	1	1	0.5	10
Category A (Hunter River) Discharge Locations 1, 2 and 3				1			0.6		10	1,500
Category B (Wetlands) Discharge Locations 4, 5 and 6				1			0.6		1.5	500

Location Code	Date /Time	Field ID	Sample Type	Category										
SW1	24/02/2023 & ^28/02/2023	SW1	Normal	A	<1	<1	<1	<1	<1	<1	<1	<1	<1	5300*
SW2		SW2	Normal	A	<1	<1	<1	<1	<1	<1	<1	<1	<1	12455*
SW3		SW3	Normal	A	<1	<1	<1	<1	<1	<1	<1	<1	<1	144*
SW4		SW4	Normal	B	<1	<1	<1	<1	<1	<1	<1	<1	<1	6900*
SW4A		SW4A	Normal	B	<1	<1	<1	<1	<1	<1	<1	<1	<1	68000*
SW5		SW5	Normal	B	<1	<1	<1	<1	<1	<1	<1	<1	<1	2500*
SW6		SW6	Normal	B	<1	<1	<1	<1	<1	<1	<1	<1	<1	196000*
SW7		SW7	Normal	B	<1	<1	<1	<1	<1	<1	<1	<1	<1	510*
SW9		SW9	Normal	A	<1	<1	<1	<1	<1	<1	<1	<1	<1	55*
SW11		SW11	Normal	A	<1	<1	<1	<1	<1	<1	<1	<1	<1	7100*

\*Thermotolerant (Faecal) Coliforms only were sampled on 28/02/2023 alongside the routine February monthly as the holding time was missed.

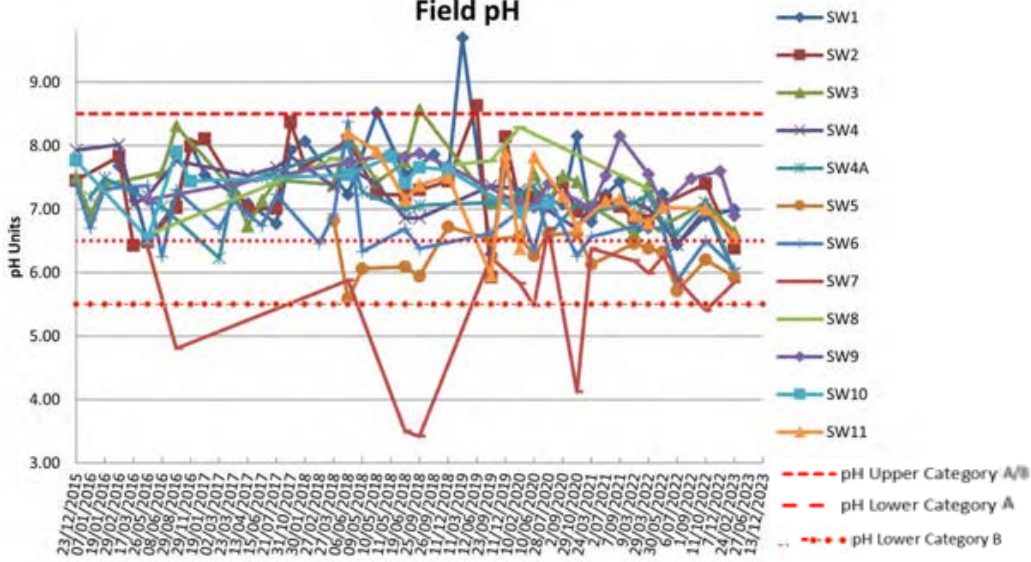
As the discharge criteria value for TRH is for the sum of total C6-C36, the C6-C9 concentration was added to the laboratory provided C10-C36 concentration for comparison. When the C6-C9 concentration was below LOR, half of the value was added to the C10-C36 concentration as a conservative estimate.

SWL was unable to be obtained from MW308R during the december quarterly as a frog living in the well prevented probe access.

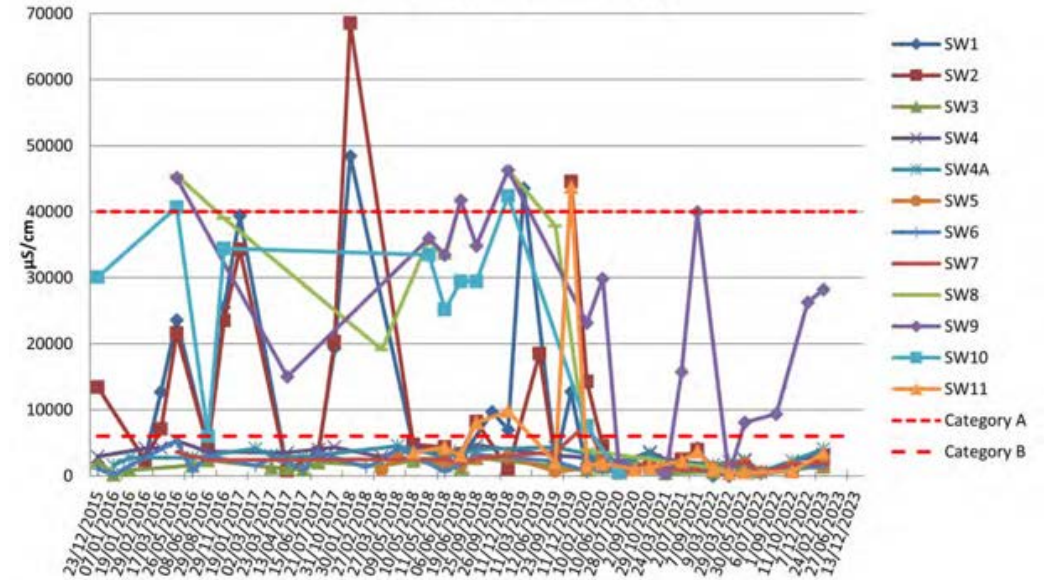
# **Appendix B**

**Historical trend analysis graphs**

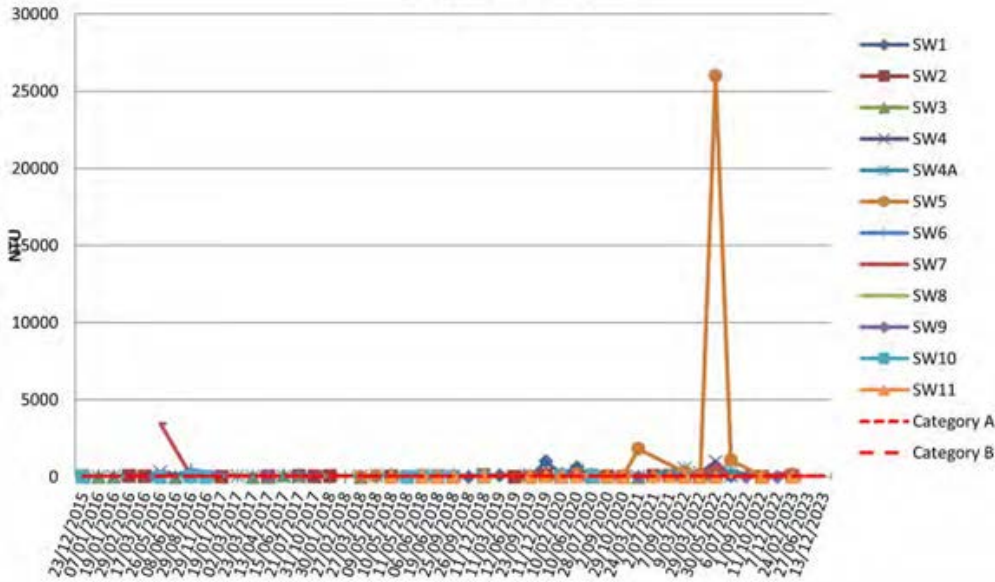
**Field pH**



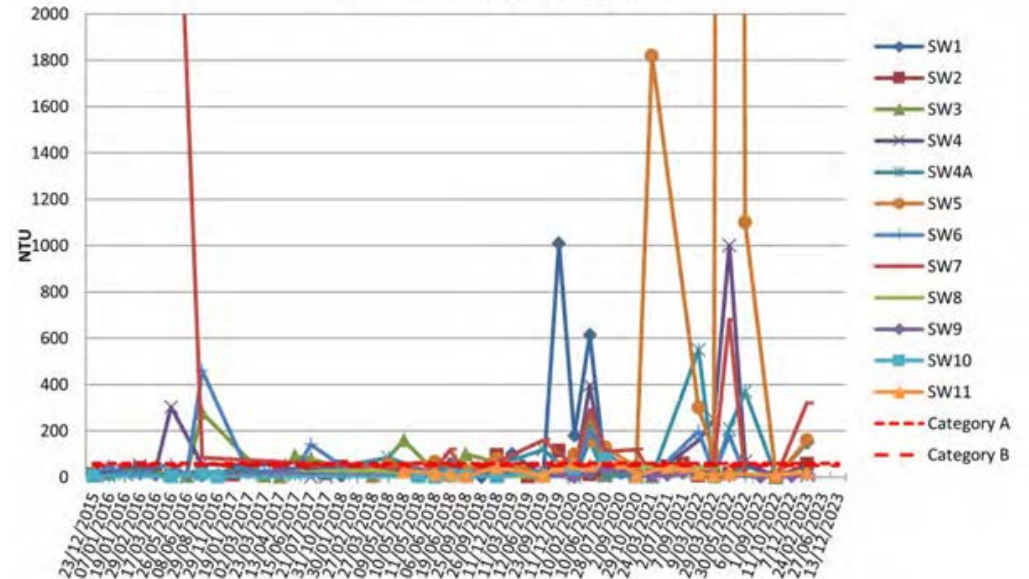
**Electrical conductivity**



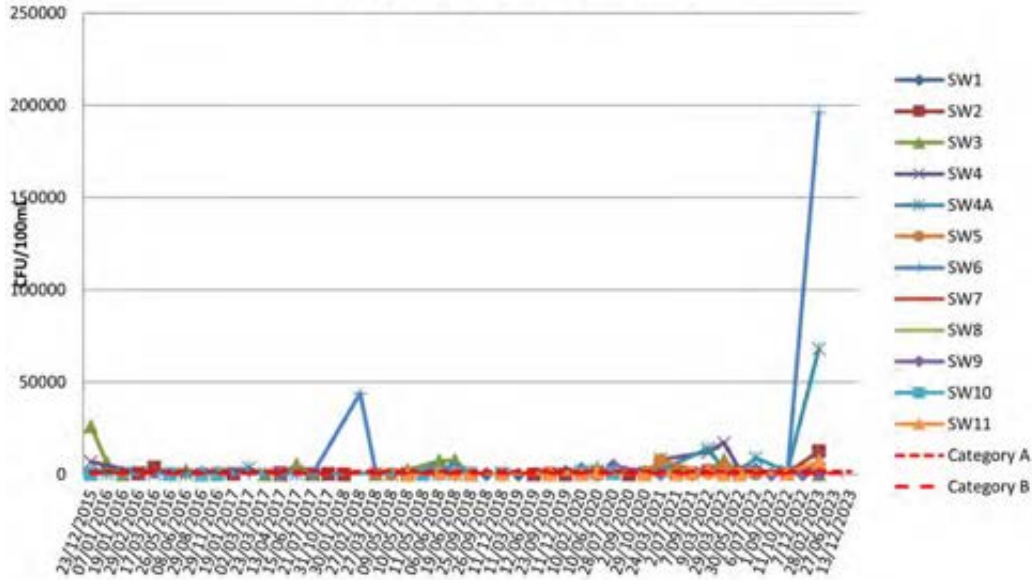
**Lab Turbidity**



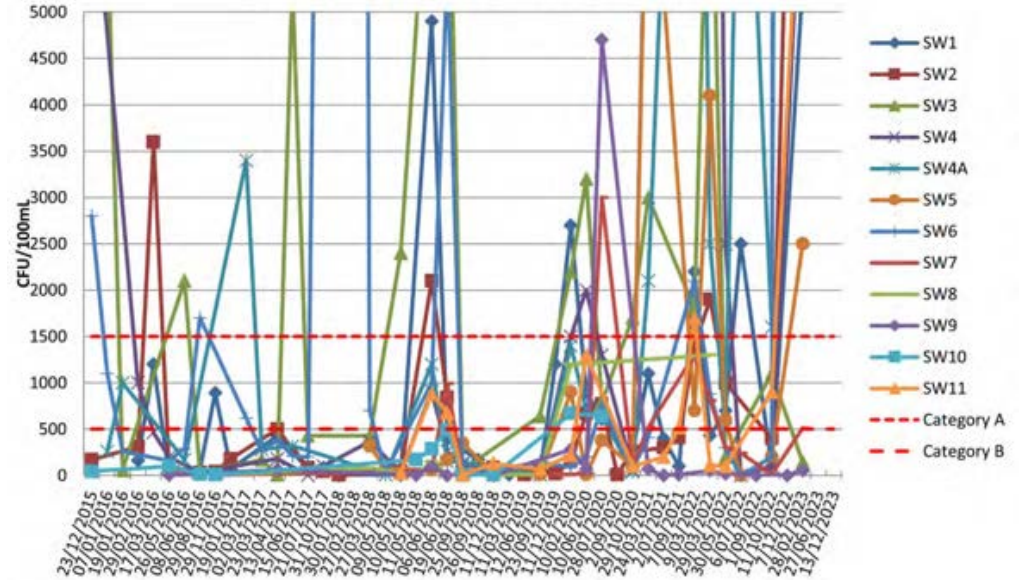
**Lab Turbidity - Magnified**



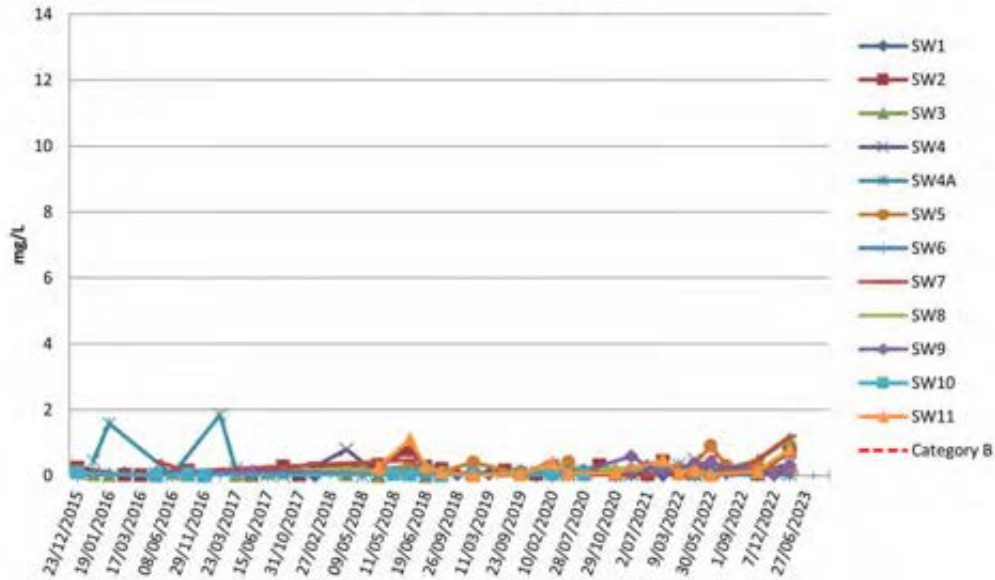
### Thermotolerant Coliforms



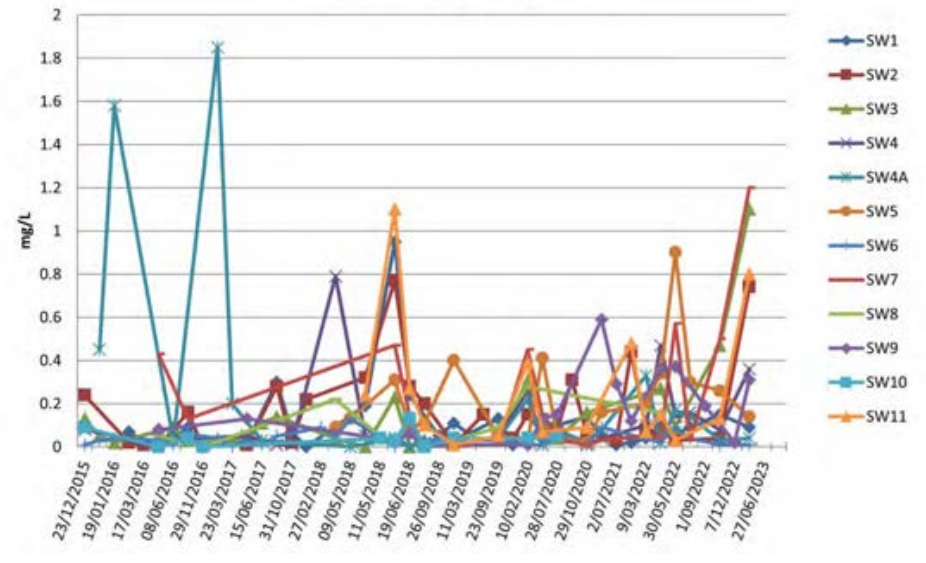
### Thermotolerant Coliforms - Magnified



### Ammonia as N



### Ammonia as N - Magnified

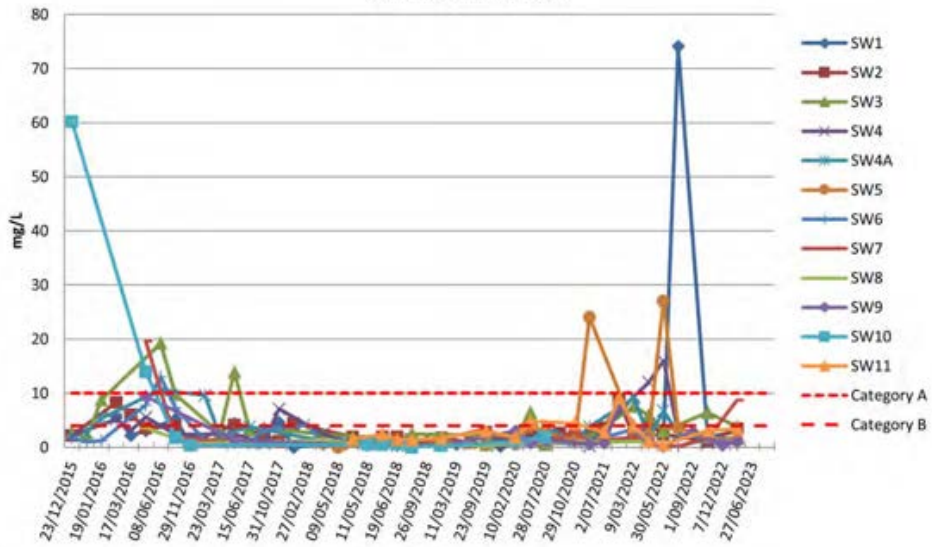


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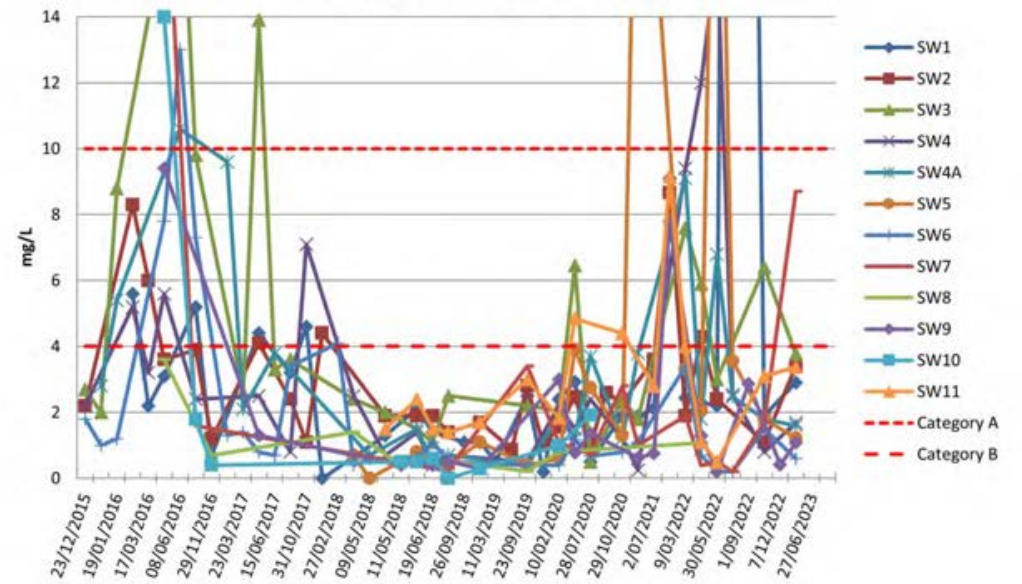
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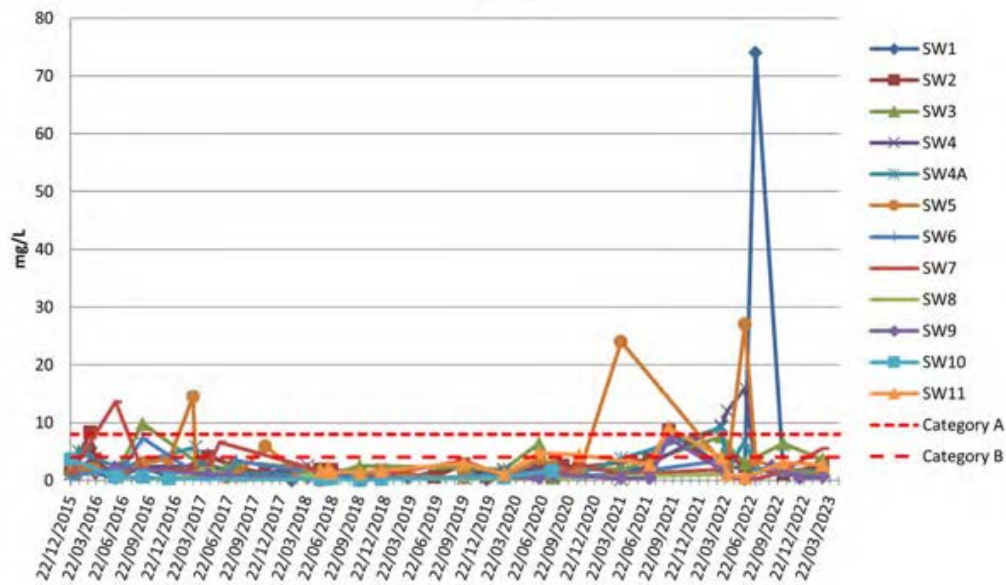
### Nitrogen (Total)



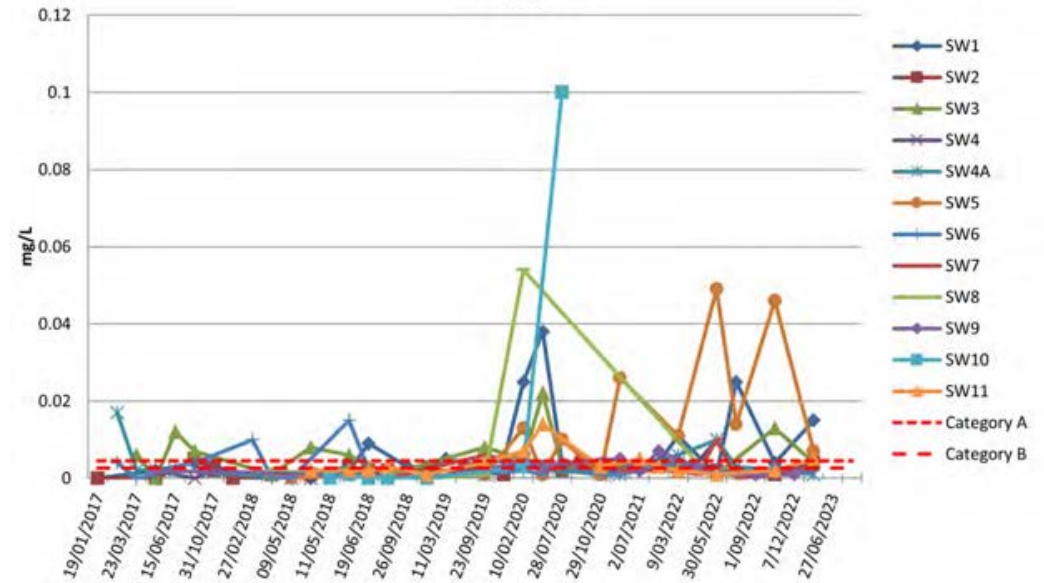
### Nitrogen (Total) - Magnified



### TKN



### Copper



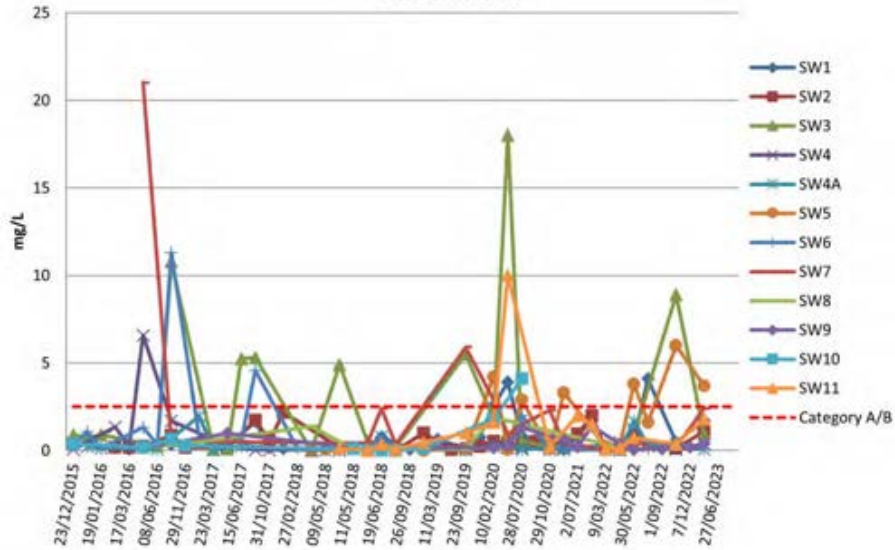
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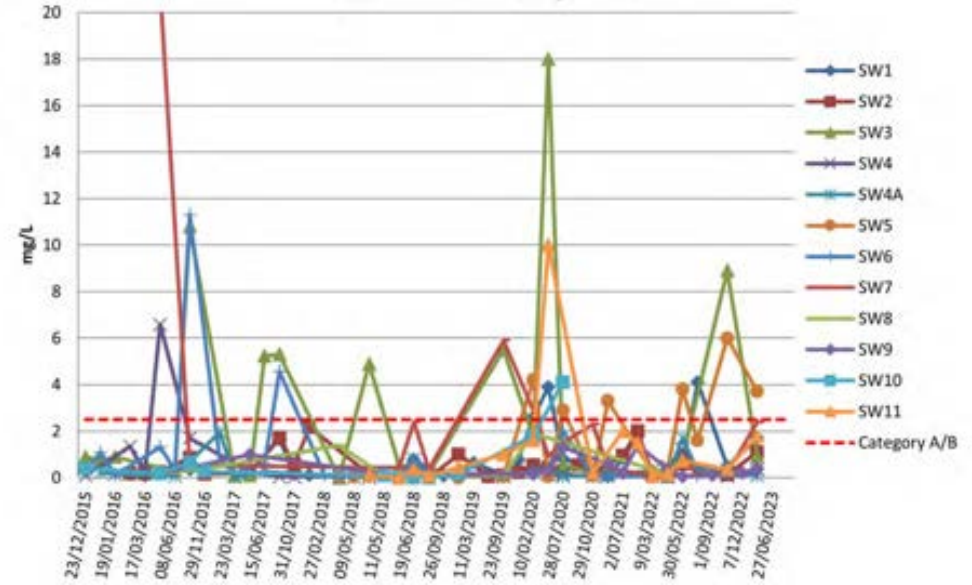
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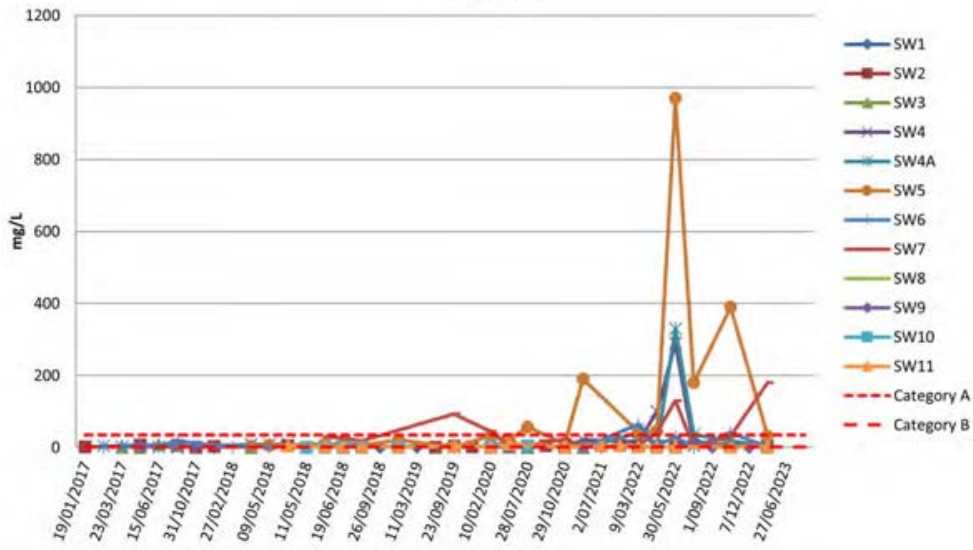
### Aluminium



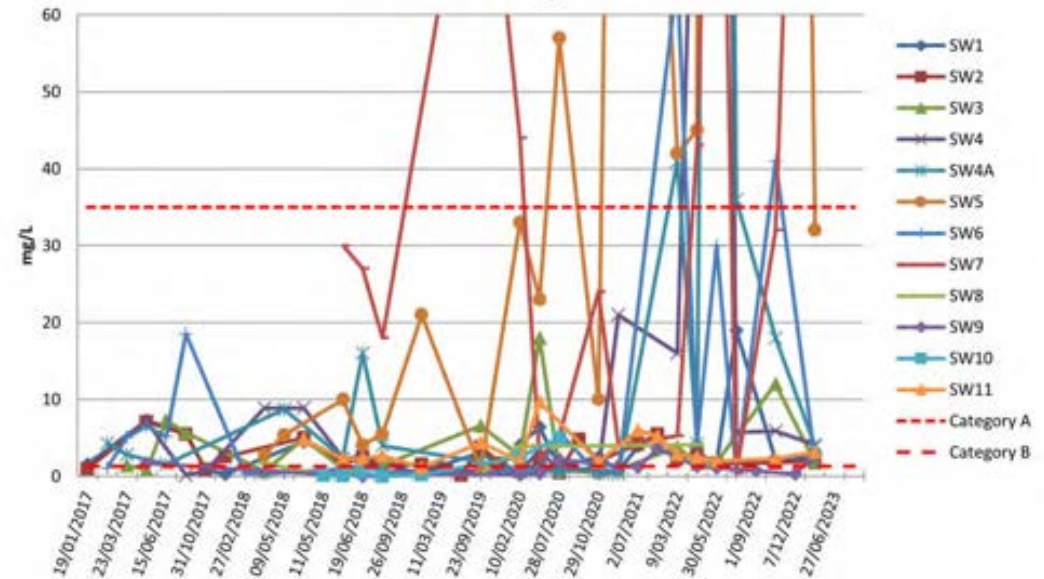
### Aluminium - Magnified



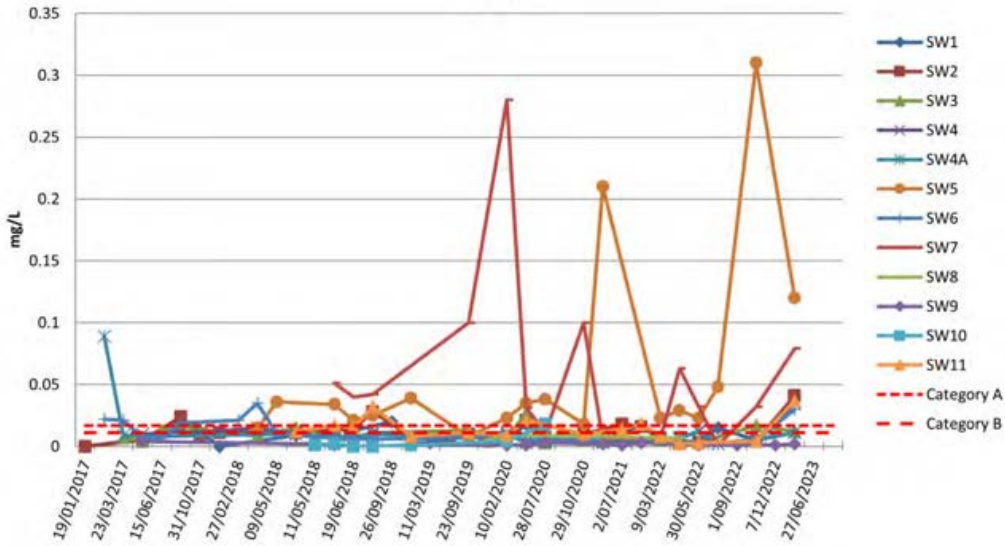
### Iron



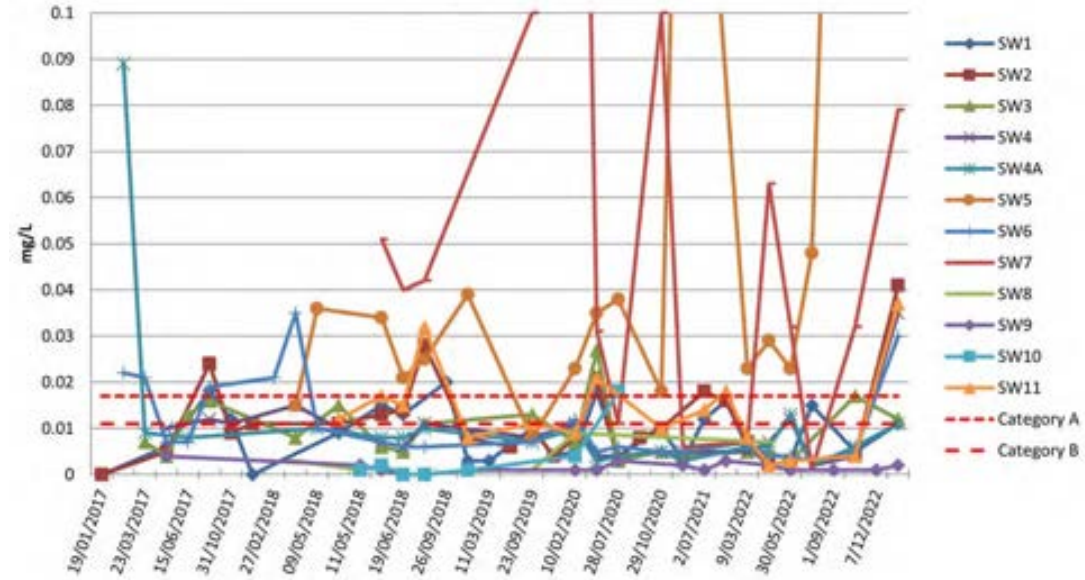
### Iron - Magnified



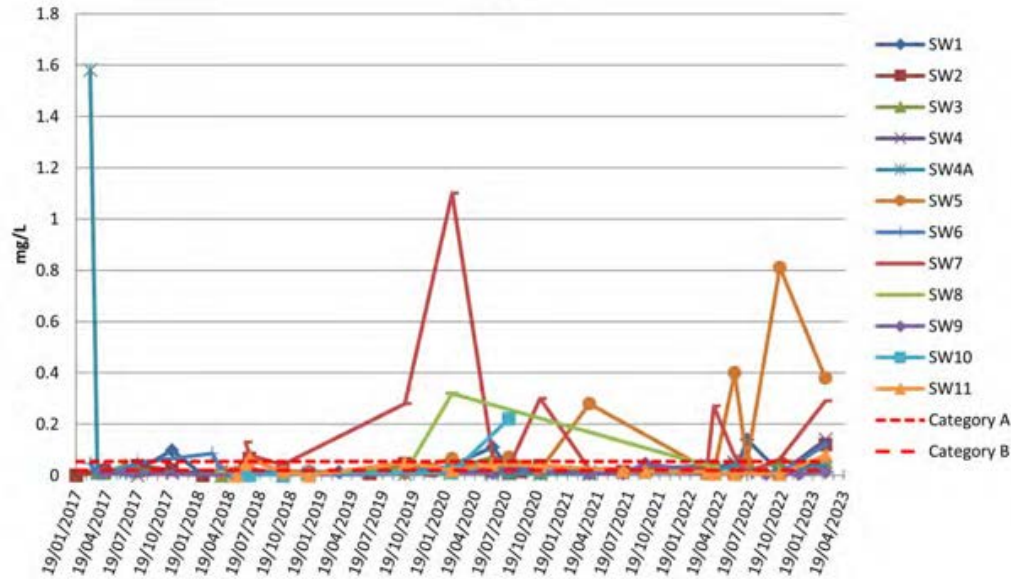
### Nickel



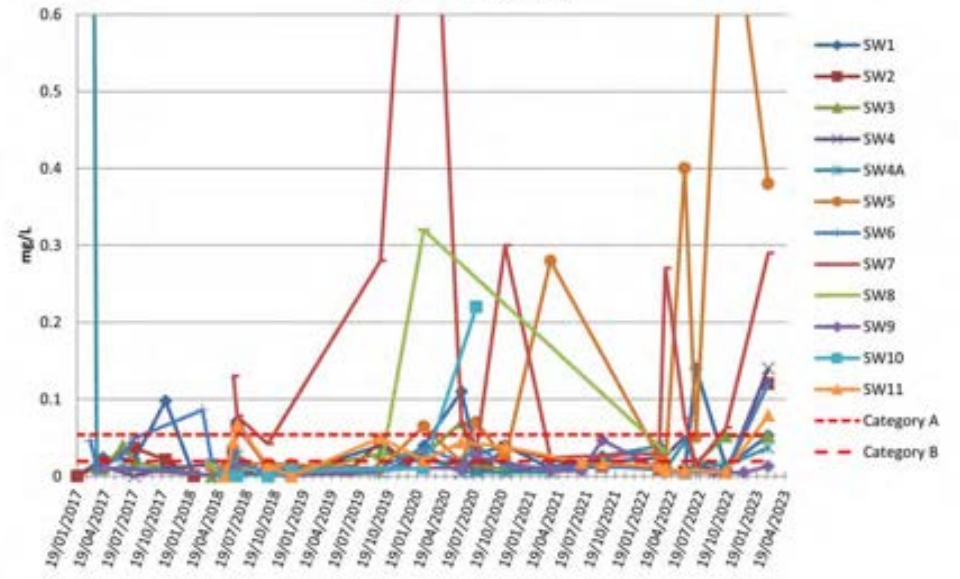
### Nickel - Magnified



### Zinc

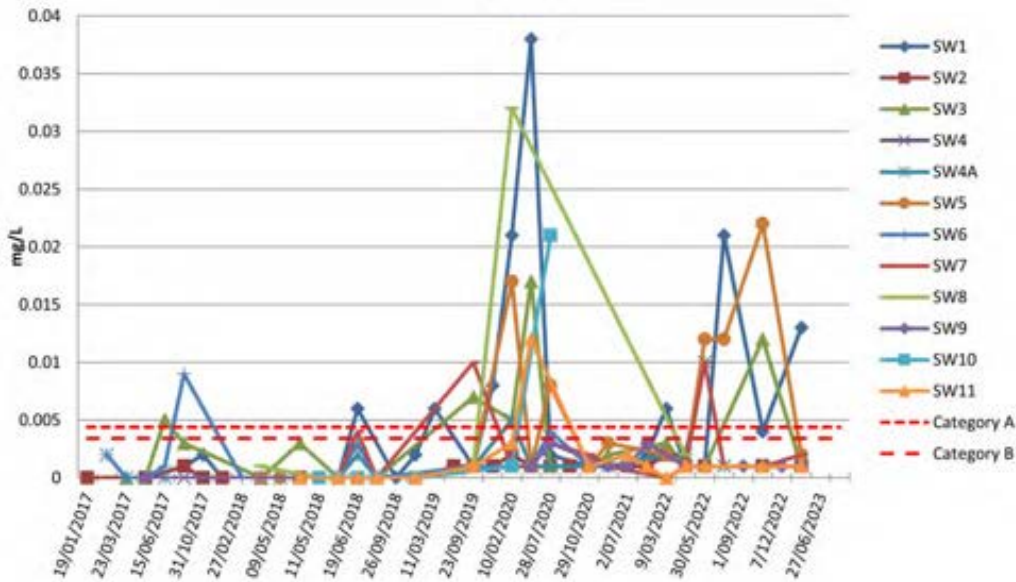


### Zinc - Magnified

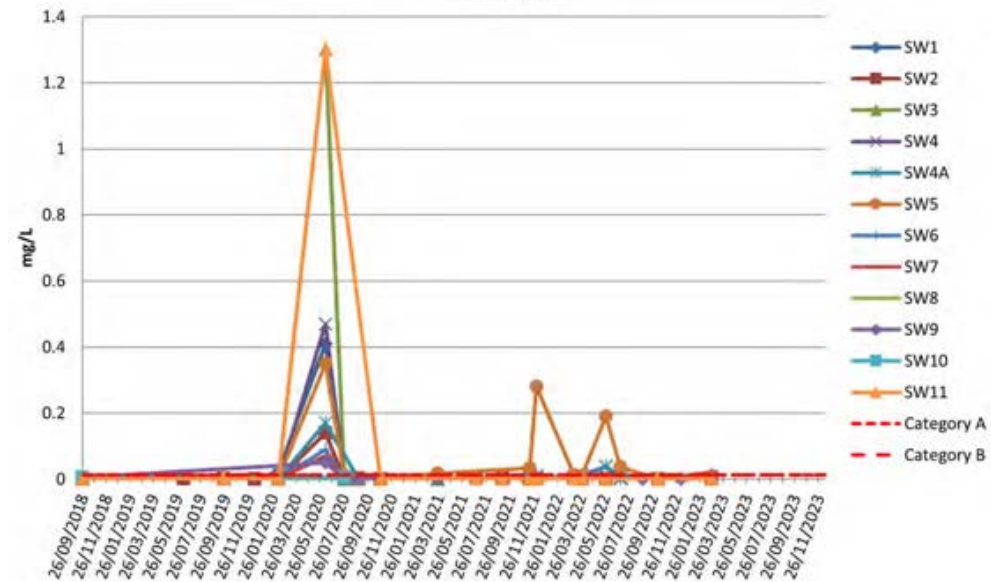




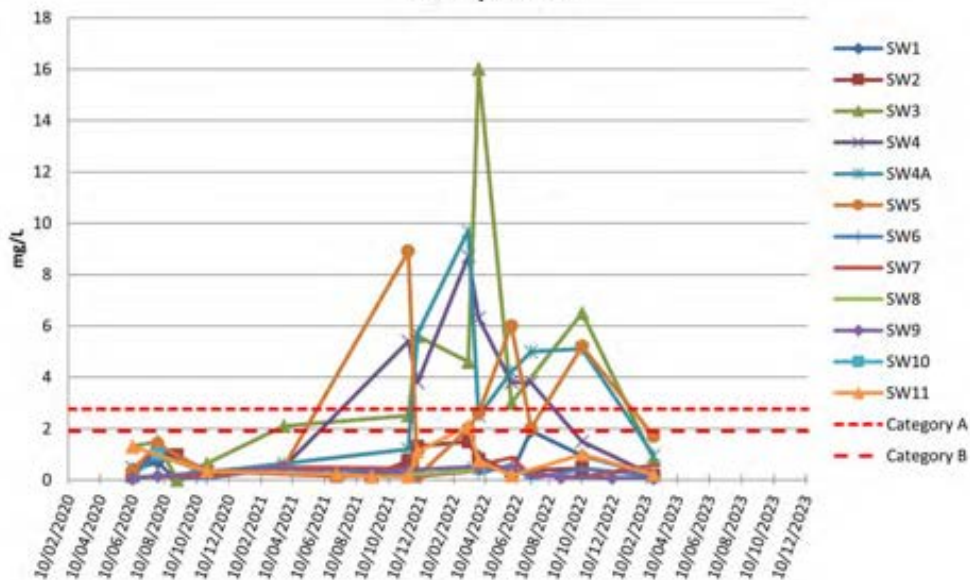
### Lead



### Arsenic



### Phosphorus



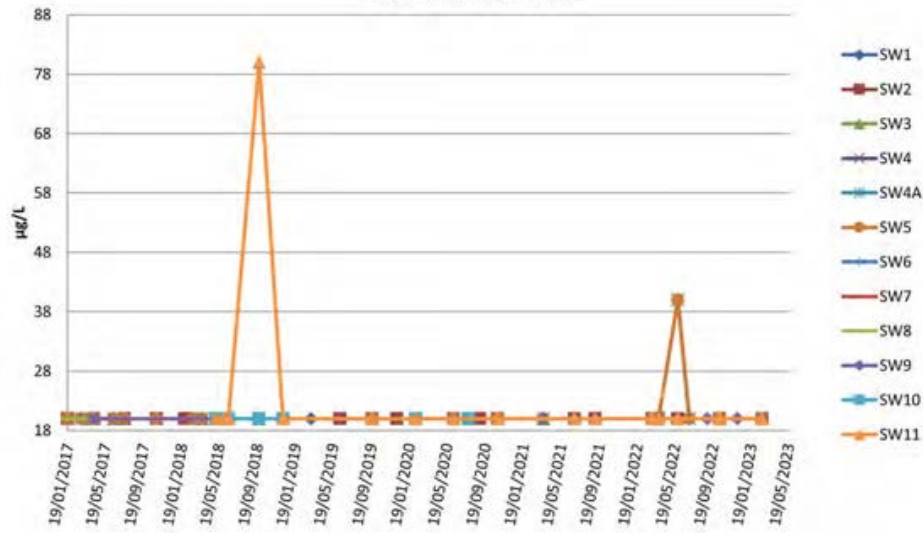
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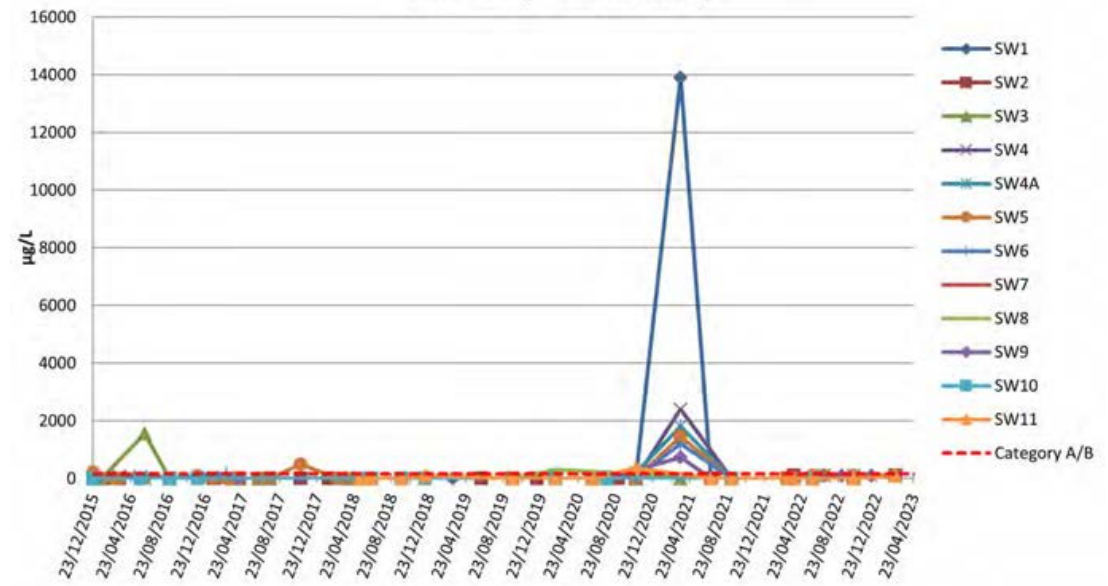
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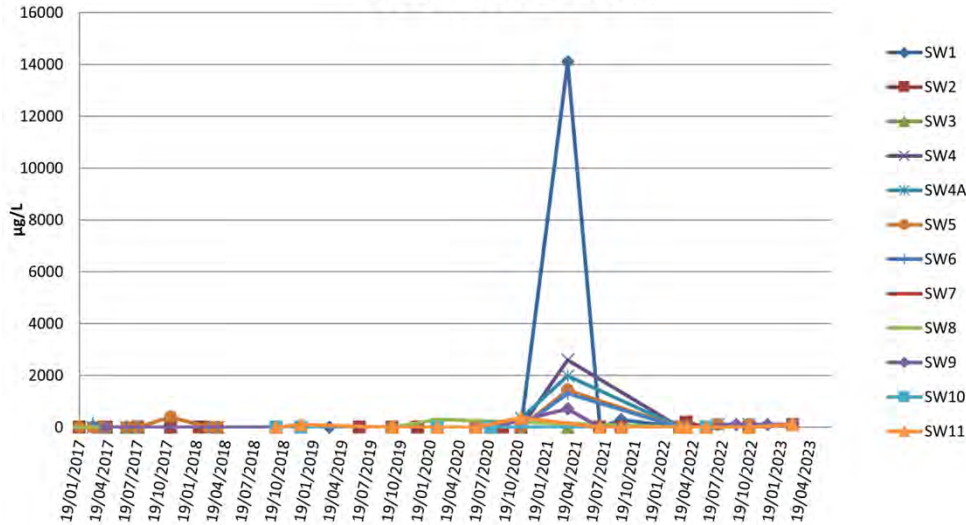
**C6-C10 Fraction**



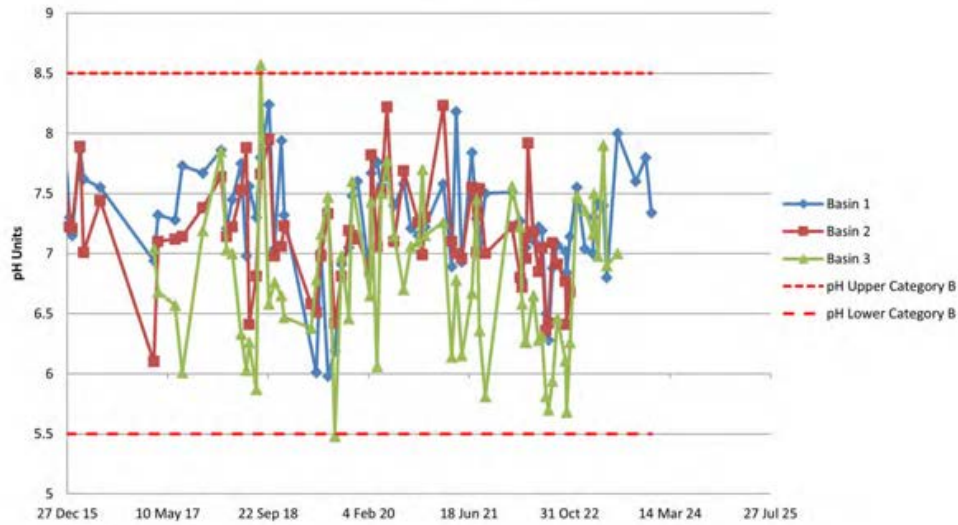
**C10-C36 (Sum of Total)**



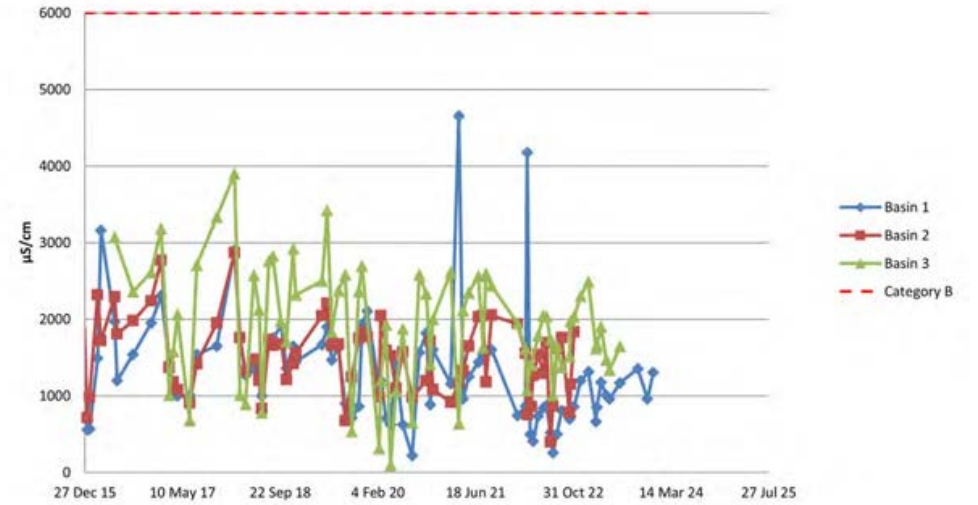
**C10-C40 (Sum of Total)**



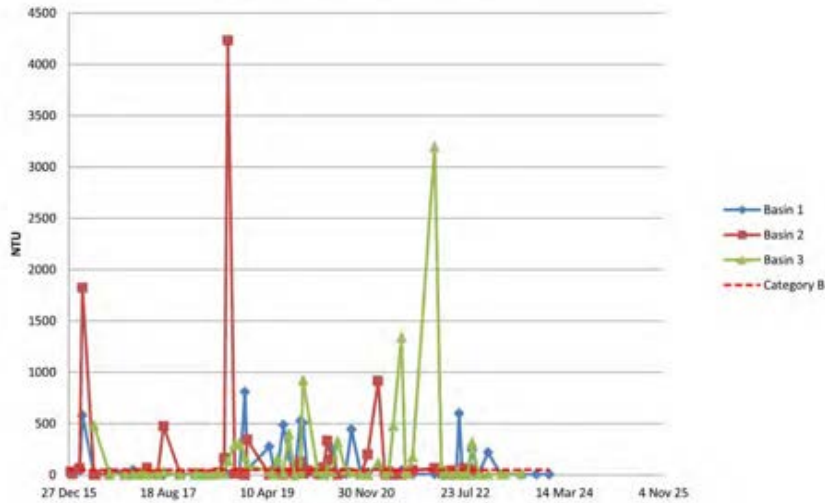
**Field pH**



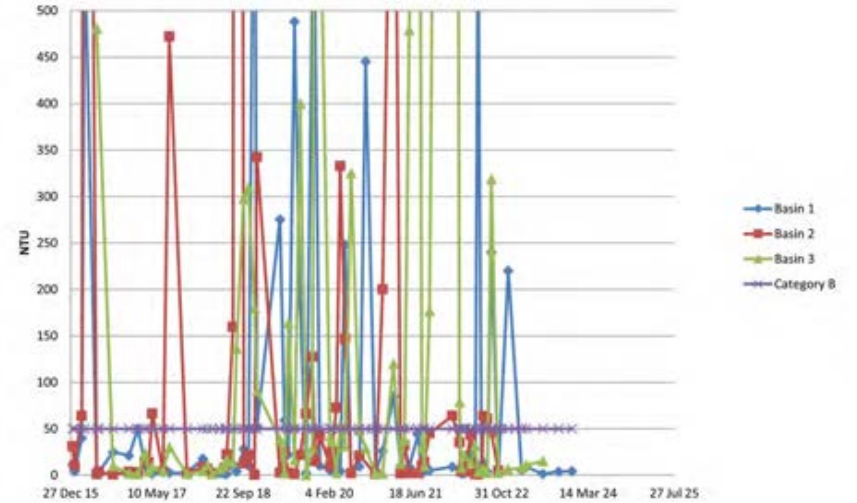
**Field Electrical Conductivity**



**Lab Turbidity**



**Lab Turbidity - Magnified**

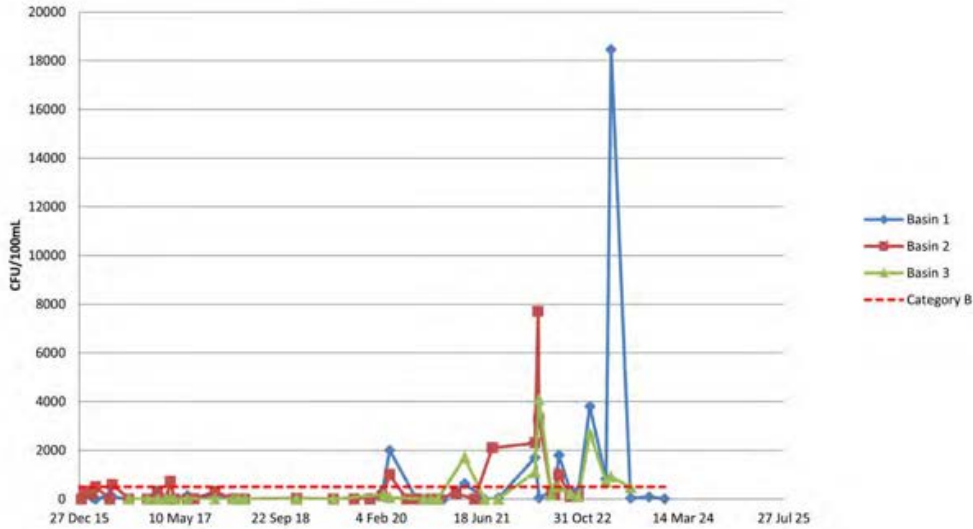


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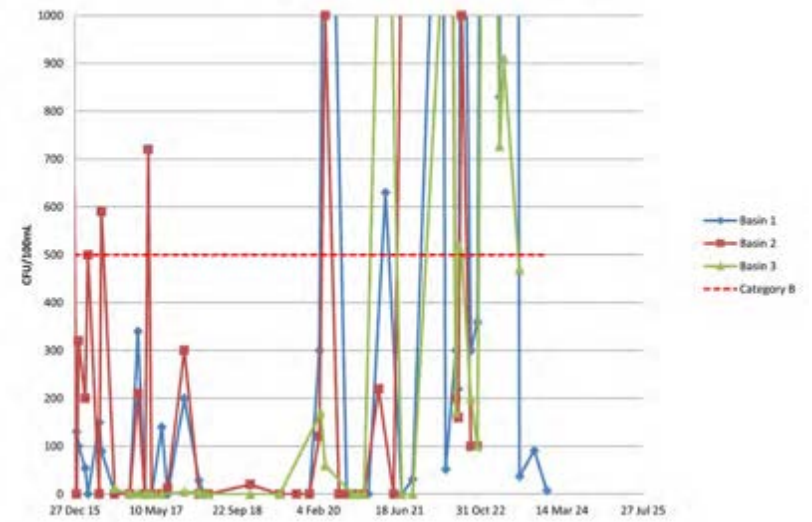
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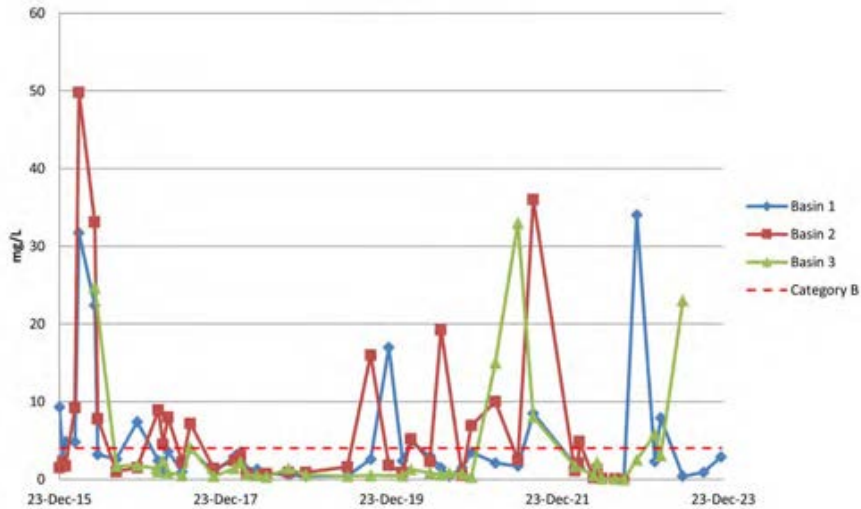
### Thermotolerant Coliforms



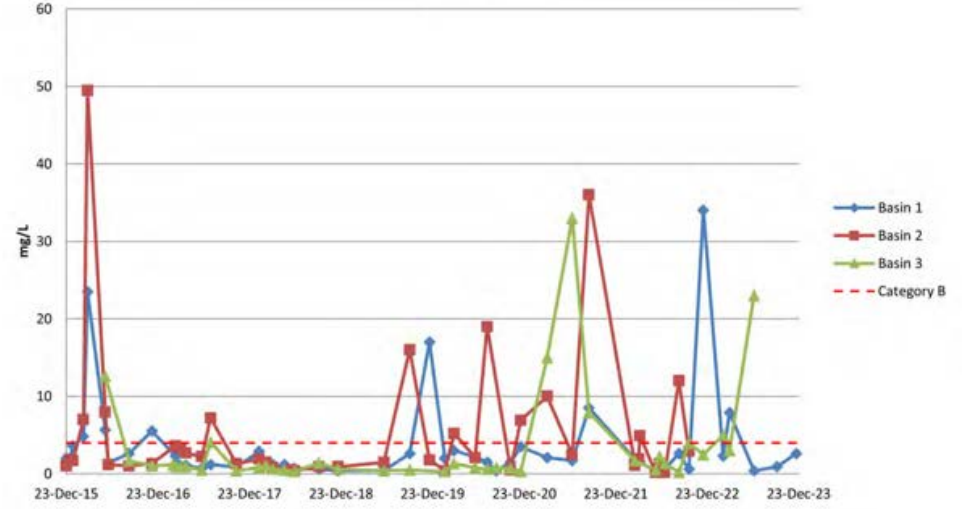
### Thermotolerant Coliforms - Magnified



### Nitrogen (Total)



### TKN

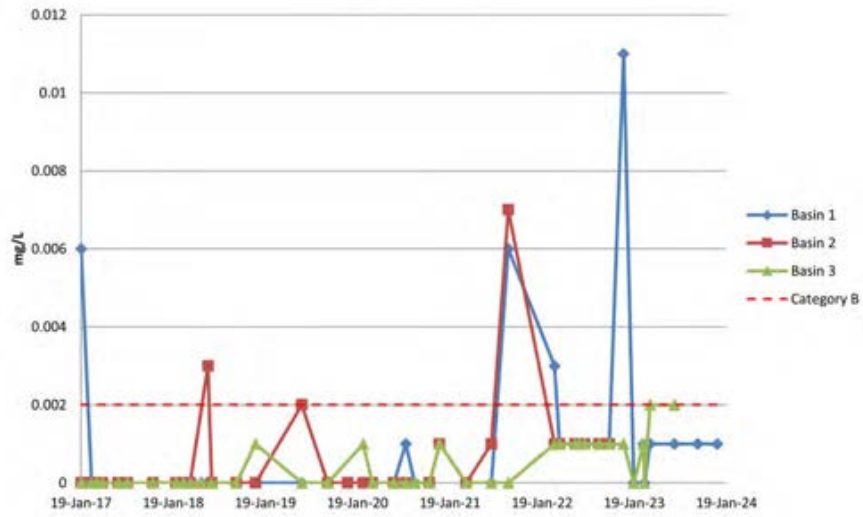


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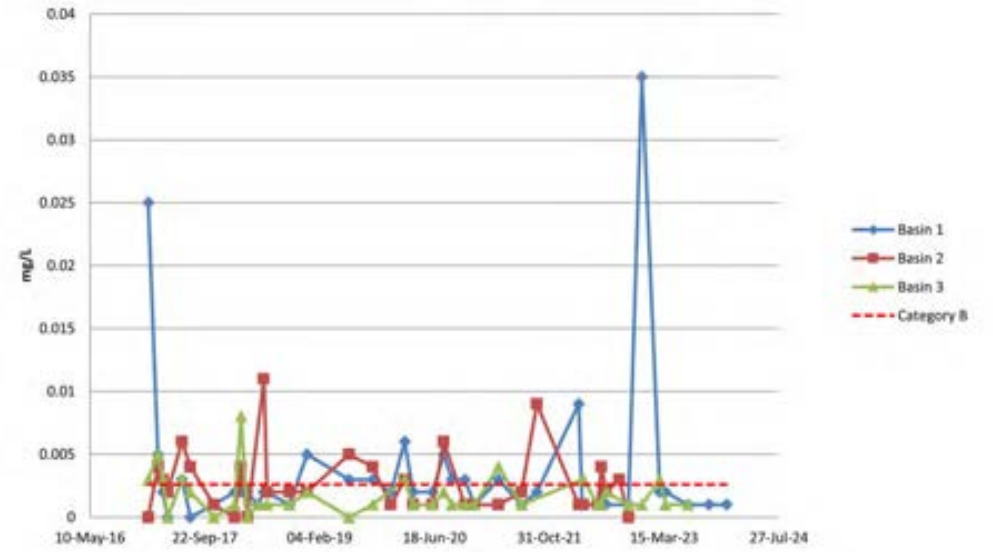
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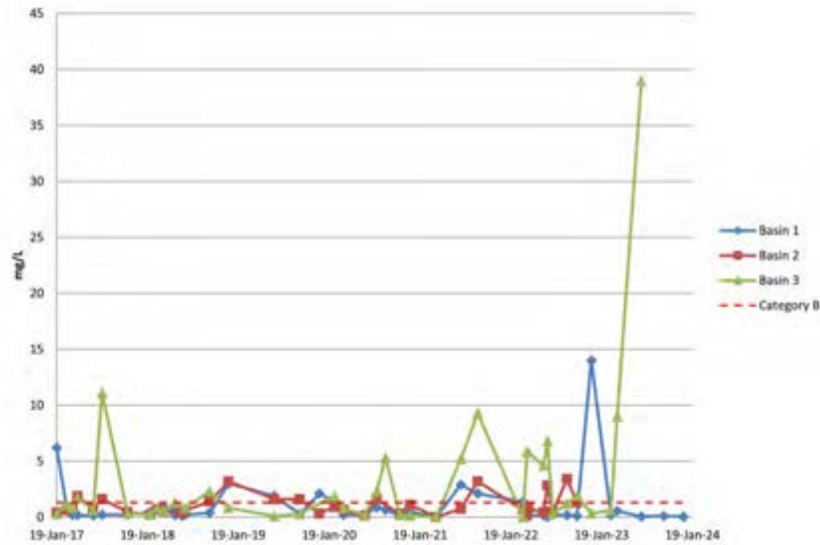
### Chromium



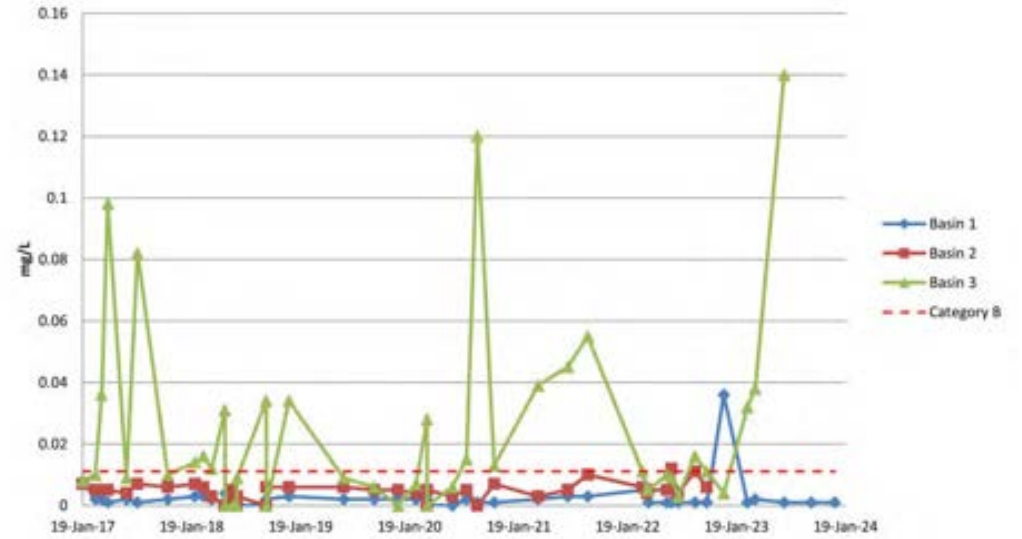
### Copper



### Iron



### Nickel

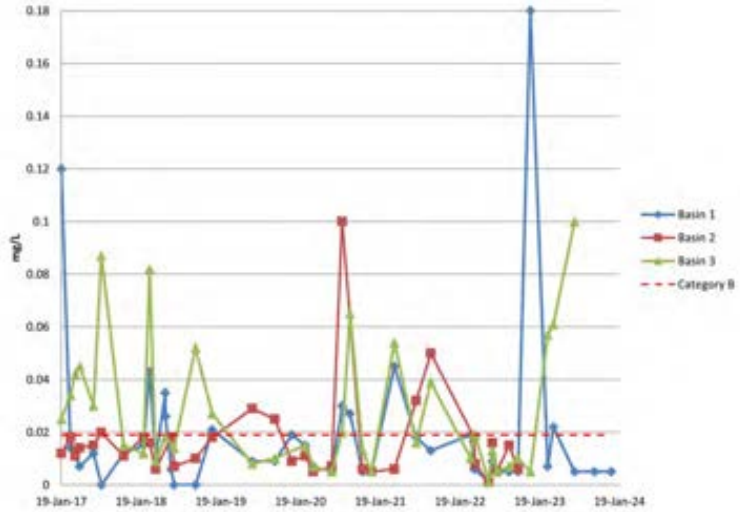


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## Appendix B

### Zinc



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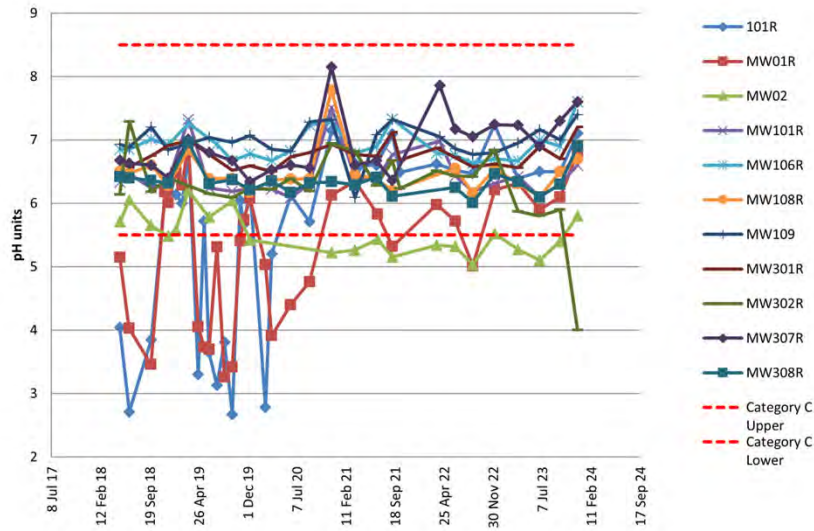
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Basin 1 – Basin 3 Historical Trends

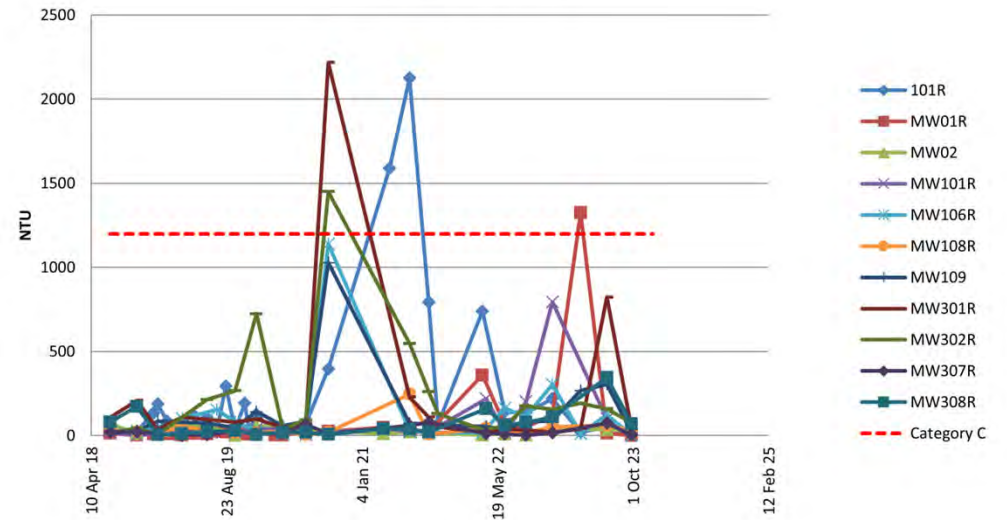
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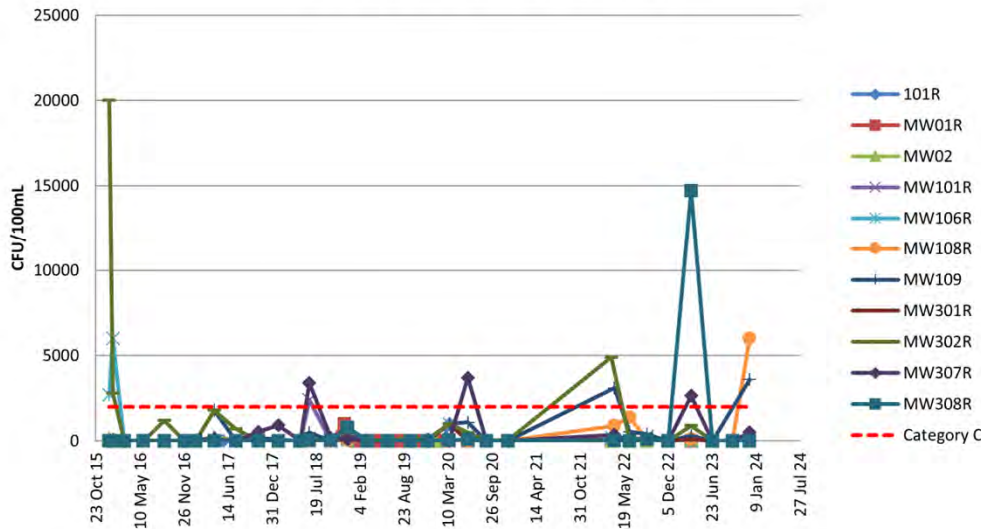
### Field pH



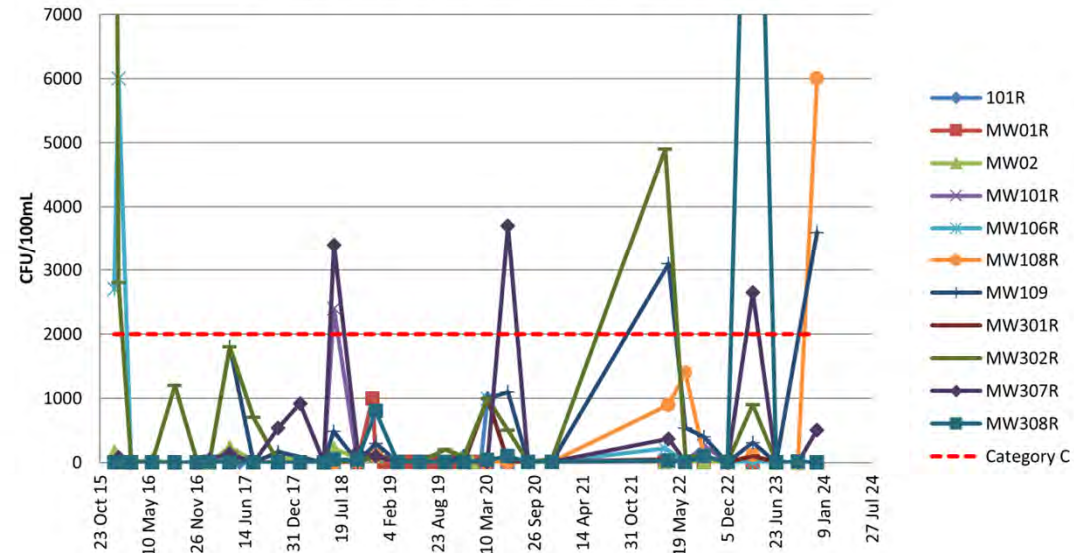
### Field Turbidity



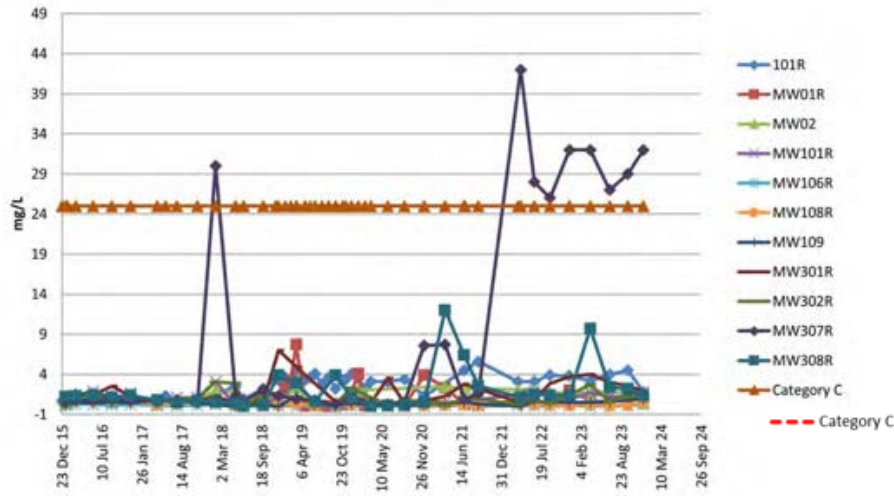
### Thermotolerant Coliforms



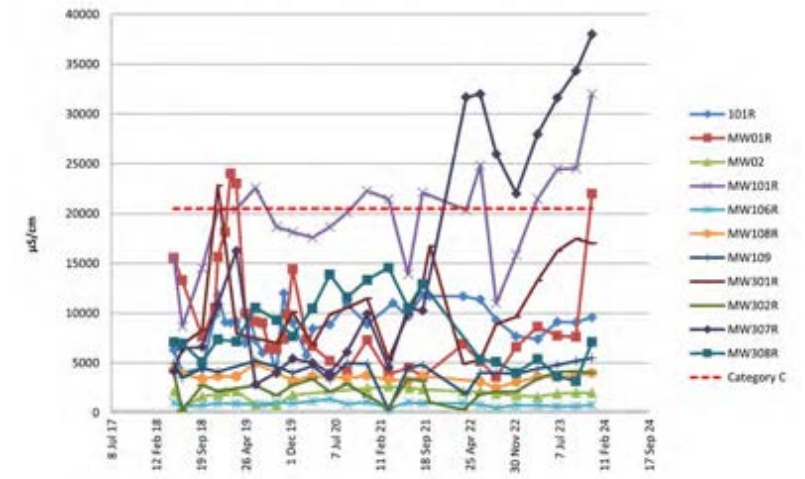
### Thermotolerant Coliforms - Magnified



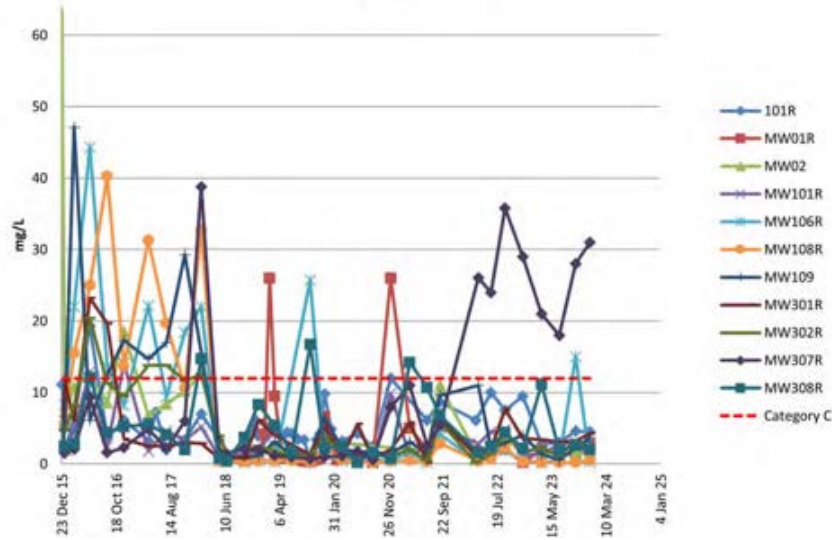
### Ammonia (as N)



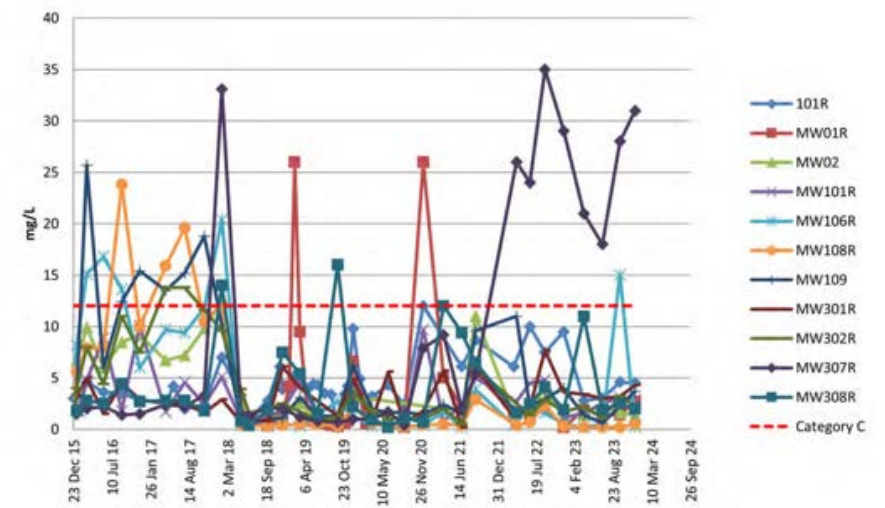
### Field Electrical Conductivity



### Nitrogen (Total)



### TKN



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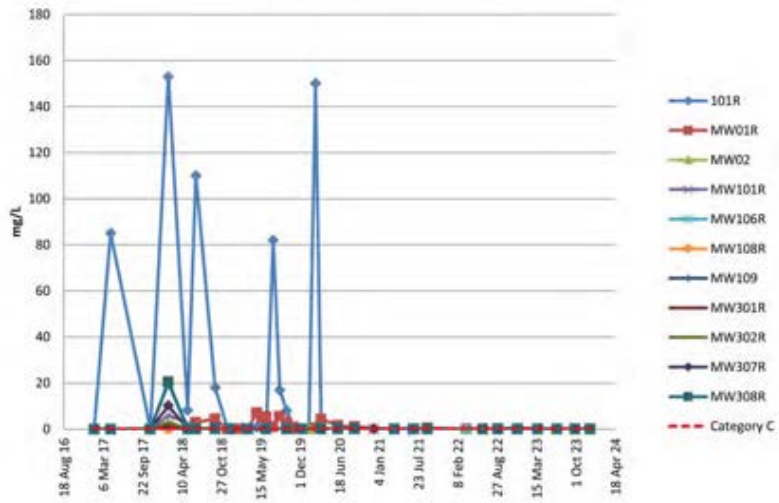
Compliance Monitoring 2023  
Groundwater Historical Trends

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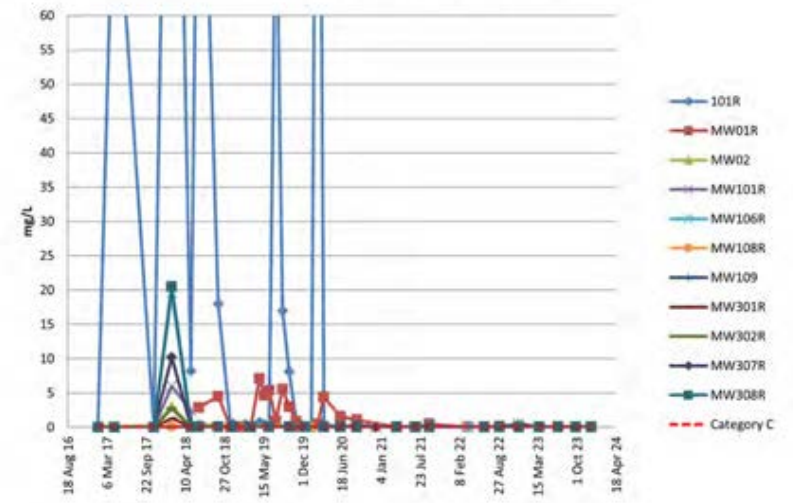
Appendix B



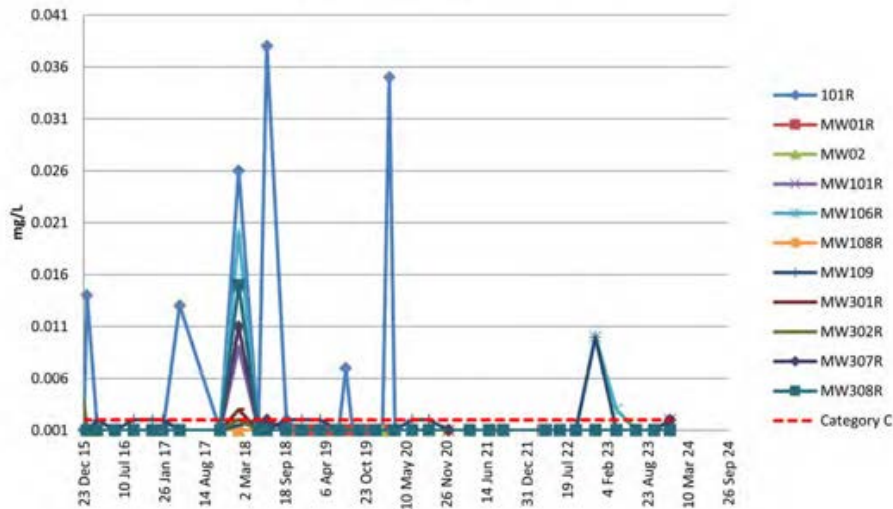
**Aluminium (filtered)**



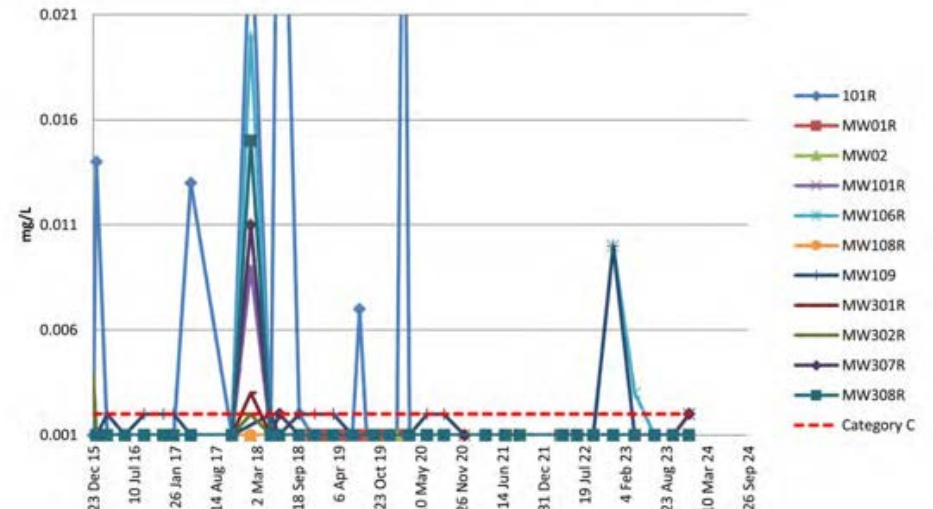
**Aluminium (filtered) - Magnified**



**Chromium (III+VI) (filtered)**



**Chromium (III+VI) (filtered) - Magnified**



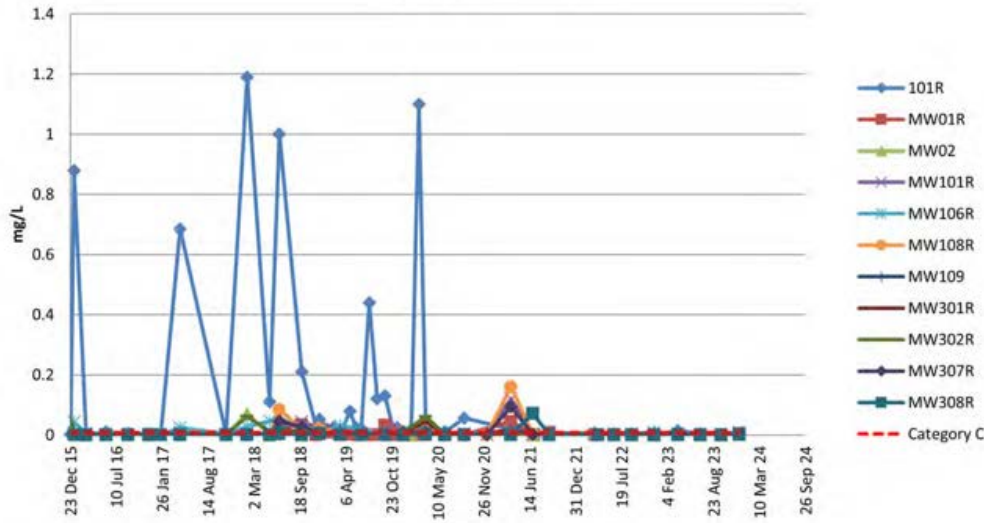
Aurizon Hexham  
Long-Term Train Support Facility

Compliance Monitoring 2023  
Groundwater Historical Trends

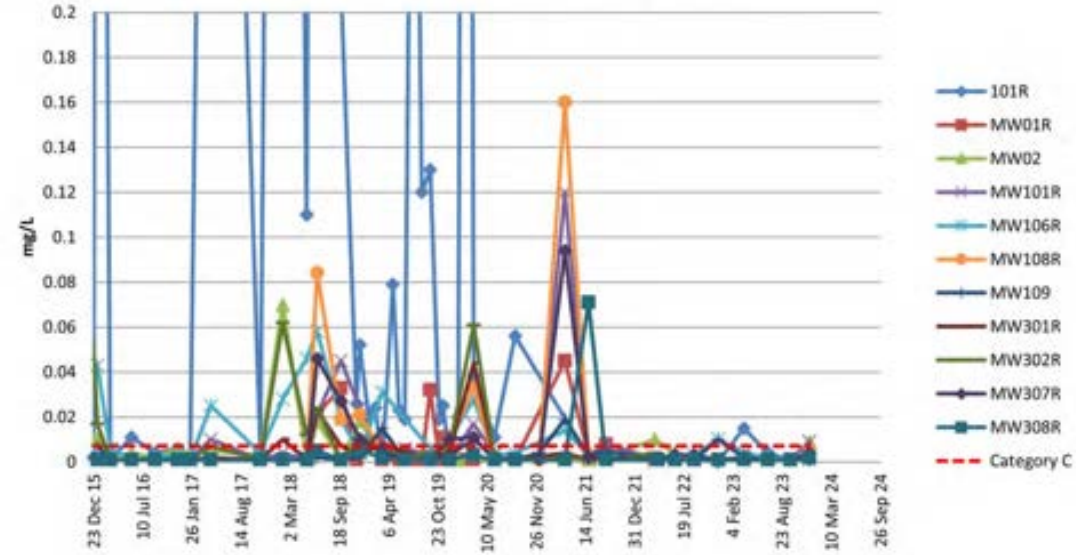
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Date | 18 January 2024

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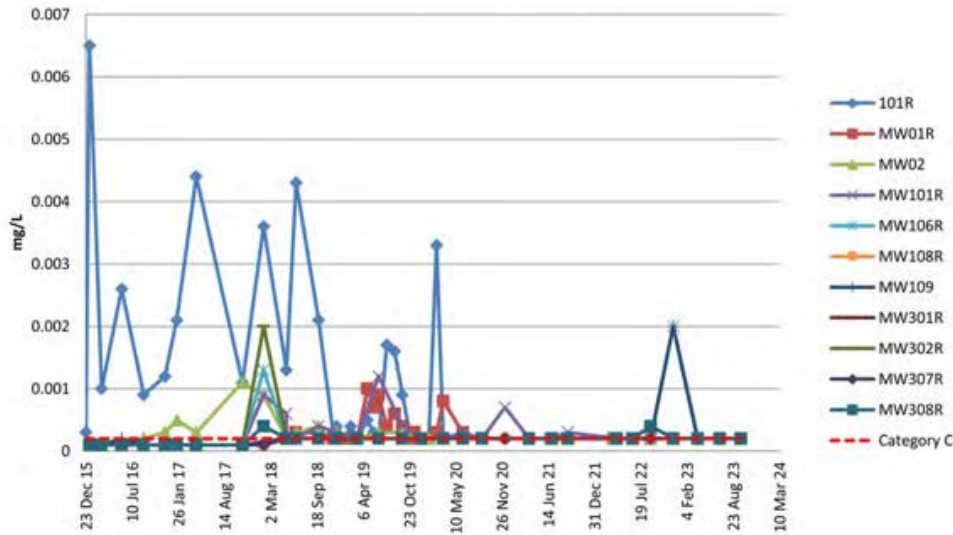
**Copper (filtered)**



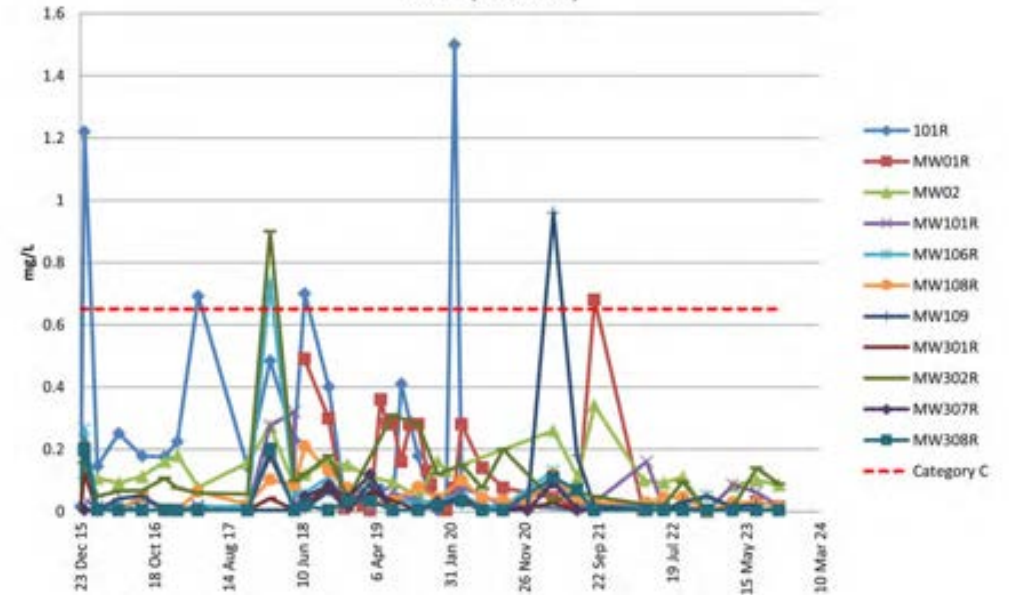
**Copper (filtered) - Magnified**



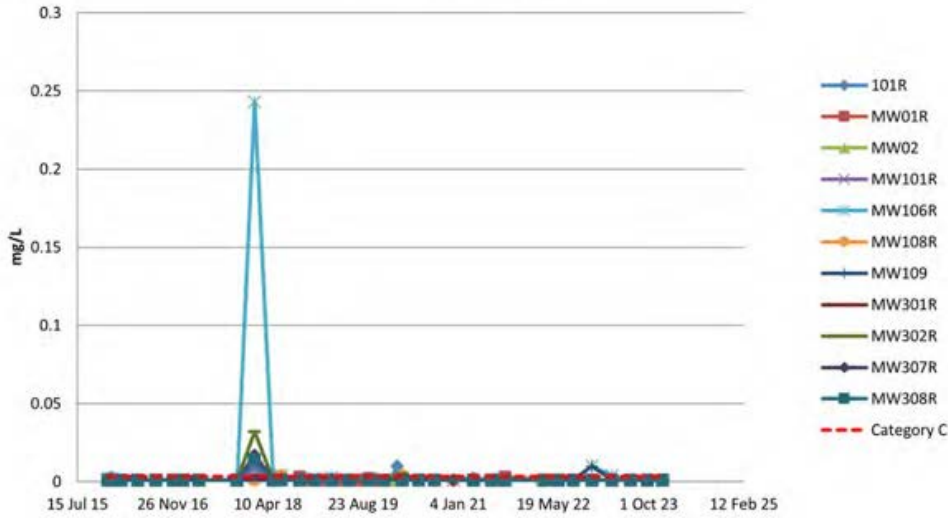
**Cadmium (filtered)**



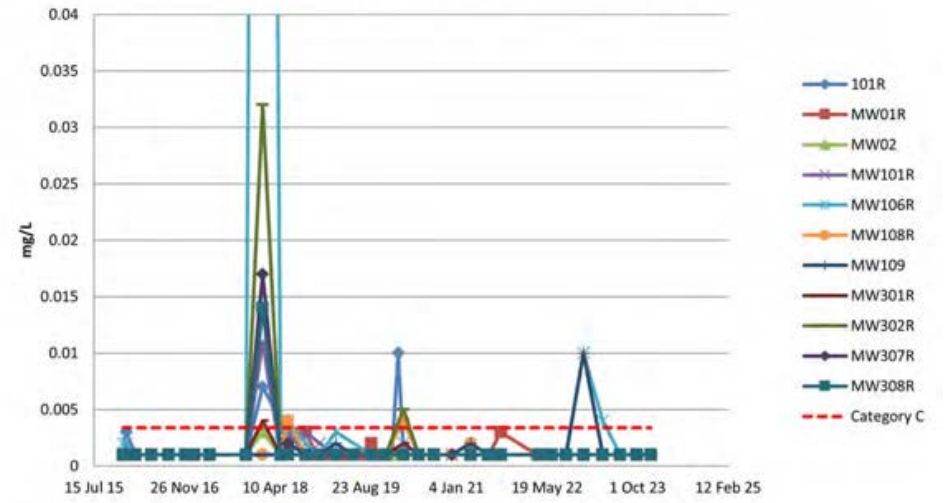
**Zinc (filtered)**



**Lead (filtered)**



**Lead (filtered) - Magnified**

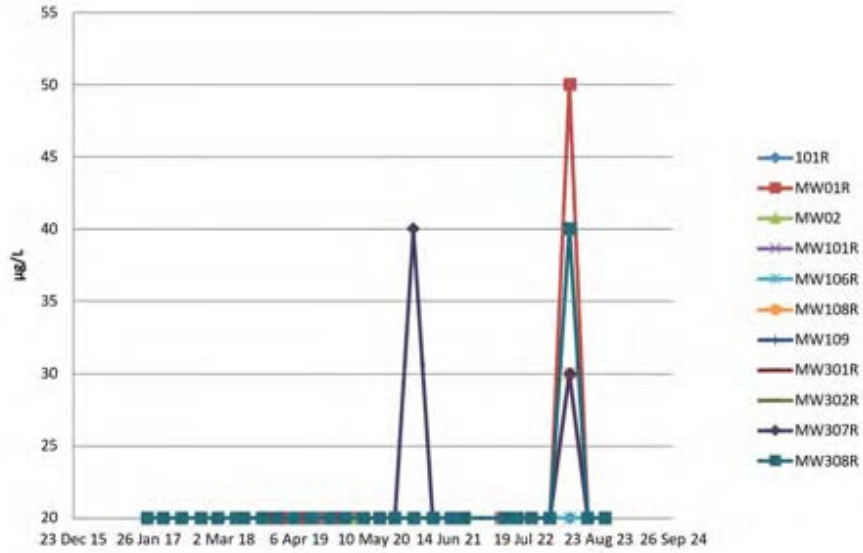


Aurizon Hexham  
 Long-Term Train Support Facility  
 Compliance Monitoring 2023  
 Groundwater Historical Trends

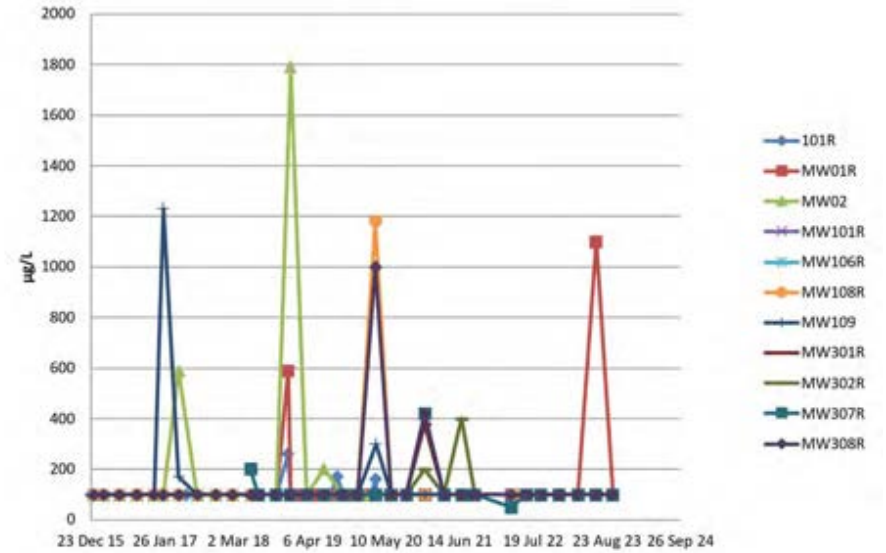
Job Number | 12611010  
 Revision | 0  
 Date | 18 January 2024

**Appendix B**

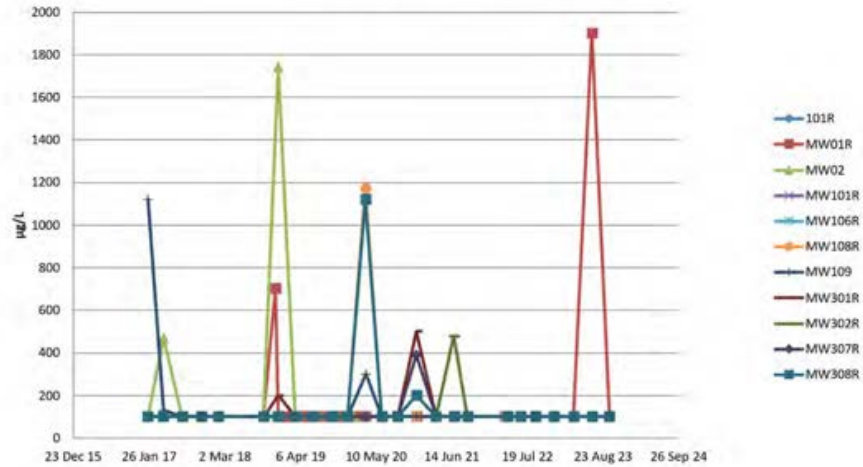
### C6-C10 Fraction



### >C10-C36 (Sum of Total)



### >C10-C40 (Sum of Total)



Aurizon Hexham  
 Long-Term Train Support Facility  
 Compliance Monitoring 2023  
 Groundwater Historical Trends

Job Number | 12611010  
 Revision | 0  
 Date | 18 January 2024

## Appendix B

# **Appendix C**

**Data quality objectives**

The Data Quality Objectives (DQOs) for the investigation are based on guidance presented in:

- NEPC (2013) National Environment Protection (Assessment of Site Contamination) Amended Measure (NEPM) No. 1 – Schedule B2, Guideline on Site Characterisation.

The DQOs establish a framework for contamination investigations which incorporates a seven stepped continuum that defines the problem at the Site. A series of stages then optimises the design of the investigation. The seven steps are outlined below:

- Step 1: State the Problem
- Step 2: Identify the Principal Study Question
- Step 3: Inputs to the Decision
- Step 4: Boundaries of the Study
- Step 5: Decision Rules
- Step 6: Tolerable Limits on Decision Errors
- Step 7: Optimisation of the Data Collection Process

An overview of the DQOs for the investigation is presented below:

### ***Step 1: State the problem***

The site is subject to compliance monitoring during the operational phase of the TSF and Aurizon are required to comply with the monitoring requirements outlined in the OEMP.

### ***Step 2: Identify the decision/goal of the study***

The key study question to be answered as part of the works is:

- Is operation of the site impacting on or presenting risks to surface and groundwater? Do concentrations of COPC exceed the adopted assessment criteria and indicate such potential for impact?

Should results be above the criteria, do these exceedances pose a potentially unacceptable risk to human health or the environment, the other decisions to be made are:

- If detected, is surface and groundwater contamination adequately delineated?
- Is further assessment or remediation/management required?

### ***Step 3: Identify the information inputs***

The following inputs are required for the decision:

- Groundwater and surface water field parameters.
- Groundwater and surface water sampling and laboratory analysis.
- Adoption of applicable guideline values for the chemicals of potential concern (COPC).
- Confirmation that data generated by sampling and analysis are of a suitable quality to allow reliable comparison to assessment criteria as per the assessment of the Data Quality Indicators.

### ***Step 4: Define the boundaries of the study***

#### **Define the spatial boundaries of the decision**

The spatial boundaries for the site are identified as the lot boundaries comprising the total site area (including non-operational vacant areas) as shown in Figure 1.1, and down to a depth of approximately 5 m bgl<sup>4</sup>, which represents the underlying groundwater aquifer in the area.

#### **Define the temporal boundaries of the decision**

The time boundaries for this investigation is the period of January to December 2023, inclusive of historical records backdating to December 2015.

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<sup>4</sup> Vertical limit approximated from depth of wells below ground level (bgl).

## **Define the scale of decision-making**

The scale of the decision-making is limited to the lateral extent of the monitoring well and surface water network.

## **Identify any potential constraints on data collection**

Sample locations may be restricted by vegetation and other infrastructure during the time of sampling, and access to wells adjacent to the railway line (Road 1) may be restricted by site activities (train movement, scheduled works etc.).

### **Step 5: Decision rules**

The degree of impact by contaminants and the decisions associated with accepting data will be assessed with reference to the adopted site investigation levels. Site specific investigation levels (discharge criteria) were developed by Douglas Partners (DP, 2014) and are discussed further in Section 1.

The decision rule was considered to be:

- If concentrations of the COPC in groundwater and surface water on-site exceed the adopted site discharge criteria, then further investigation of longer term trends, and possible source identification and delineation, will be required. Continued exceedances in longer term trends of identification of contamination source/s will trigger contingency responses as outlined in the OEMP.

### **Step 6: Tolerable limits on decision errors**

Data generated during this investigation must be appropriate to allow decisions to be made with confidence.

Two types of decision errors are possible:

- Surface and groundwater at the site is considered 'uncontaminated' when in fact it is contaminated (false negative).
- Surface and groundwater at the site is considered 'contaminated' when in fact it is not contaminated (false positive).

The implications of false negative decision errors are considered less acceptable than that of false positives. False negative errors could involve unknown unacceptable risk/s to human health and/or the environment, and potentially lead to litigation action if the site is found to be unsuitable for ongoing use in the future. Conservative investigation criteria which incorporate a safety factor should therefore be applied. As noted, discharge criteria for the site have been established by Douglas Partners. GHD has not reviewed the conservativeness of these criteria.

The risks associated with the false positive errors are primarily limited to additional, unwarranted investigation and/or remediation costs. The risk of false positive errors occurring will be minimised by reducing the potential for unrepresentative data which could arise from the following causes:

- Sampling errors which occur when the sampling program does not adequately detect the variability of a contaminant from point to point across the site, (i.e., the samples collected are not representative of the site conditions).
- Measurement errors which occur during sample collection, handling preparation, analysis, and data reduction.

The potential for such errors are reduced by the works being carried out by experienced and trained professionals employing specific and repeatable methodologies and implementing a QA program.

The QA/QC assessment will include data quality indicators (DQIs) for completeness, comparability, representativeness, precision, and accuracy.

The DQIs for sampling techniques and laboratory analysis of collected samples identifies the acceptable level of error for this investigation. The data quality objectives will be assessed by reference to data quality indicators as follows:

- Data representativeness - expresses the degree which sample data accurately and precisely represents a characteristic of a population or an environmental condition. Representativeness is achieved by collecting samples in appropriate locations across the site, and by using an adequate number of sample locations to characterise soil, groundwater, and soil vapour at and surrounding the site. Consistent and repeatable sampling techniques and methods are utilised throughout the sampling.
- Completeness - defined as the percentage of measurements made which are judged to be valid measurements. The completeness goal is set at there being sufficient valid data generated during the study. If there is insufficient valid data, then additional data are required to be collected.
- Comparability - is a qualitative parameter expressing the confidence with which one data set can be compared with the other. This is achieved through maintaining a level of consistency in techniques used to collect samples and ensuring analysing laboratories use consistent analysis techniques and reporting methods.
- Precision - measures the reproducibility of measurements under a given set of conditions. The precision of the data is assessed by calculating the Relative Percent Difference (RPD) between duplicate sample pairs.

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

Where  $C_o$  = Analyte concentration of the original sample

$C_d$  = Analyte concentration of the duplicate sample

GHD adopts a nominal acceptance criterion of  $\pm 50\%$  RPD for field duplicates and splits for organics and an acceptance criterion of  $\pm 30\%$  RPD for inorganics. However, it is noted that this will not always be achieved, particularly at low analyte concentrations:

- Accuracy - measures the bias in a measurement system. Accuracy can be undermined by such factors as field contamination of samples, poor preservation of samples, poor sample preparation techniques and poor selection of analytical techniques by the analysing laboratory. Accuracy is assessed by reference to the analytical results of laboratory control samples, laboratory spikes, laboratory blanks and analyses against reference standards. The nominal “acceptance limits” on laboratory control samples are defined as follows:
  - Laboratory spikes – 60-130% recovery for metals/inorganics and 60-140% for organics.
  - Laboratory duplicates – Nominal RPD values of 30% or lower. Higher RPD values are generally considered acceptable when the result is close to the LOR.
  - Laboratory Surrogates (Organics only) – 60% - 130% recovery.
  - Laboratory blanks - <LOR.

If any of the DQIs are not met, further investigation will be necessary to determine whether the non-conformance will significantly affect the usefulness of the data.

### **Step 7: Optimisation of the data collection process**

This step involves identifying the most resource effective sampling and analysis design, which is required to satisfy the DQOs. The sampling and analysis plan, which was developed to meet this objective.



# **Appendix D**

**Quarterly sampling methodology**

## General

A summary of the methods employed for monitoring conducted in 2023 is outlined below. Field sampling methodology was conducted in accordance with GHD's sampling SAQP.

Refer to individual reports for detailed sampling methodology and laboratory analytical program (GHD 2023a to 2023c, and 2024a).

## HSE

A project specific JSEA was prepared prior to attending site each monitoring round.

All field work was conducted by suitably experienced professionals inducted to the site and who actively participated in the development of the JSEA.

## 2023 sampling schedule

Table 2.3 provides the 2023 sampling schedule completed at the site.

## Laboratory analysis

Water samples were submitted to laboratories accredited by NATA. Specifically, primary, and duplicate samples were submitted to Eurofins Mgt (Eurofins) and triplicate samples to ALS Environmental (ALS). The laboratory analytical suite is as per the OEMP.

**Table D-1**      *Hexham water quality analytical suite*

Parameter		Units
Physico-chemical	BOD	mg/L
	Conductivity	µS/cm
	pH	pH Units
	Turbidity	NTU
	Total Susp. Solids	mg/L
Heavy Metals	Aluminium (Al)	mg/L
	Arsenic (As)	mg/L
	Cadmium (Cd)	mg/L
	Chromium (Cr)	mg/L
	Copper (Cu)	mg/L
	Iron (Fe)	mg/L
	Lead (Pb)	mg/L
	Mercury (Hg)	mg/L
	Nickel (Ni)	mg/L
	Zinc (Zn)	mg/L
Nutrients	Ammonia	mg/L
	TKN	mg/L
	Total Nitrogen	mg/L
	Total Phosphorus	mg/L
Microbiological	Faecal Coliforms	cfu/100mL
Total hydrocarbon fractions	TRH C6-C36	µg/L
Polycyclic aromatic hydrocarbons	Naphthalene	µg/L
	Phenanthrene	µg/L

Parameter		Units
	Anthracene	µg/L
	Fluoranthene	µg/L
	Benzo(a) pyrene	µg/L
	Total PAHs	µg/L
Volatile hydrocarbons	Benzene	µg/L
	Ethyl Benzene	µg/L
	Toluene	µg/L
	Xylenes (total)	µg/L
	Naphthalene	µg/L

Note: Analysis for surface water metals are to be **total metals** and groundwater is to be **dissolved metals** (filtered)

# **Appendix E**

**Laboratory reports**

GHD Pty Ltd  
3/24 Honeysuckle Dve  
Newcastle  
NSW 2300



NATA Accredited  
Accreditation Number 1261  
Site Number 1254

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

Attention: **Leslie Maranciak**

Report **967060-W**  
Project name **AURIZON HEXHAM WATER MONITORING**  
Project ID **12584780**  
Received Date **Feb 24, 2023**

Client Sample ID			SW1	SW2	SW3	SW4
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			M23- Fe0061429	M23- Fe0061430	M23- Fe0061431	M23- Fe0061432
Date Sampled			Feb 24, 2023	Feb 24, 2023	Feb 24, 2023	Feb 24, 2023
Test/Reference	LOR	Unit				
<b>Total Recoverable Hydrocarbons</b>						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1) <sup>N04</sup>	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2) <sup>N01</sup>	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
<b>BTEX</b>						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	73	76	80	68
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>						
Naphthalene <sup>N02</sup>	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
<b>Polycyclic Aromatic Hydrocarbons</b>						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene <sup>N07</sup>	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001

Client Sample ID			SW1	SW2	SW3	SW4
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			M23- Fe0061429	M23- Fe0061430	M23- Fe0061431	M23- Fe0061432
Date Sampled			Feb 24, 2023	Feb 24, 2023	Feb 24, 2023	Feb 24, 2023
Test/Reference	LOR	Unit				
<b>Polycyclic Aromatic Hydrocarbons</b>						
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	102	103	124	110
p-Terphenyl-d14 (surr.)	1	%	114	104	106	112
<b>Ammonia (as N)</b>						
Ammonia (as N)	0.01	mg/L	0.09	0.74	1.1	0.36
<b>Biochemical Oxygen Demand (BOD-5 Day)</b>						
Biochemical Oxygen Demand (BOD-5 Day)	5	mg/L	61	< 5	< 5	< 5
<b>Conductivity (at 25 °C)</b>						
Conductivity (at 25 °C)	10	uS/cm	2800	2600	1200	2400
<b>Nitrate &amp; Nitrite (as N)</b>						
Nitrate & Nitrite (as N)	0.05	mg/L	1.2	0.70	0.17	0.09
<b>pH (at 25 °C)</b>						
pH (at 25 °C)	0.1	pH Units	7.4	7.3	7.3	6.5
<b>Phosphate total (as P)</b>						
Phosphate total (as P)	0.01	mg/L	0.18	0.17	0.77	0.17
<b>Total Kjeldahl Nitrogen (as N)</b>						
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	1.7	2.7	3.6	1.6
<b>Total Nitrogen (as N)*</b>						
Total Nitrogen (as N)*	0.2	mg/L	2.9	3.4	3.77	1.69
<b>Total Suspended Solids Dried at 103 °C to 105 °C</b>						
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	91	90	42	8.6
<b>Turbidity</b>						
Turbidity	1	NTU	150	57	26	8.8
<b>Heavy Metals</b>						
<b>Aluminium</b>						
Aluminium	0.05	mg/L	1.7	1.1	0.93	0.35
<b>Arsenic</b>						
Arsenic	0.001	mg/L	0.011	0.002	0.003	< 0.001
<b>Cadmium</b>						
Cadmium	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
<b>Chromium</b>						
Chromium	0.001	mg/L	0.002	0.002	< 0.001	< 0.001
<b>Copper</b>						
Copper	0.001	mg/L	0.015	0.004	0.004	0.005
<b>Iron</b>						
Iron	0.05	mg/L	2.5	2.0	1.8	4.1
<b>Lead</b>						
Lead	0.001	mg/L	0.013	0.001	0.001	< 0.001
<b>Mercury</b>						
Mercury	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
<b>Nickel</b>						
Nickel	0.001	mg/L	0.011	0.041	0.012	0.035
<b>Zinc</b>						
Zinc	0.005	mg/L	0.053	0.12	0.052	0.14

Client Sample ID			SW4A	SW5	SW6	SW7
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			M23- Fe0061433	M23- Fe0061434	M23- Fe0061435	M23- Fe0061436
Date Sampled			Feb 24, 2023	Feb 24, 2023	Feb 24, 2023	Feb 24, 2023
Test/Reference	LOR	Unit				
<b>Total Recoverable Hydrocarbons</b>						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1) <sup>N04</sup>	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2) <sup>N01</sup>	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1

Client Sample ID			SW4A	SW5	SW6	SW7
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			M23- Fe0061433	M23- Fe0061434	M23- Fe0061435	M23- Fe0061436
Date Sampled			Feb 24, 2023	Feb 24, 2023	Feb 24, 2023	Feb 24, 2023
Test/Reference	LOR	Unit				
<b>BTEX</b>						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	81	67	78	79
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>						
Naphthalene <sup>N02</sup>	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
<b>Polycyclic Aromatic Hydrocarbons</b>						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene <sup>N07</sup>	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1,2,3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	96	113	87	67
p-Terphenyl-d14 (surr.)	1	%	85	147	92	98
<b>Ammonia (as N)</b>						
Ammonia (as N)	0.01	mg/L	0.04	0.14	< 0.01	1.2
<b>Biochemical Oxygen Demand (BOD-5 Day)</b>						
Biochemical Oxygen Demand (BOD-5 Day)	5	mg/L	< 5	5.2	< 5	41
<b>Conductivity (at 25 °C)</b>						
Conductivity (at 25 °C)	10	uS/cm	3000	1200	1300	1400
<b>Nitrate &amp; Nitrite (as N)</b>						
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05	0.12	< 0.05	3.2
<b>pH (at 25 °C)</b>						
pH (at 25 °C)	0.1	pH Units	7.1	6.7	6.9	3.7
<b>Phosphate total (as P)</b>						
Phosphate total (as P)	0.01	mg/L	0.95	1.7	0.17	0.58
<b>Total Kjeldahl Nitrogen (as N)</b>						
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	1.6	1.1	0.6	5.5
<b>Total Nitrogen (as N)*</b>						
Total Nitrogen (as N)*	0.2	mg/L	1.6	1.22	0.6	8.7
<b>Total Suspended Solids Dried at 103 °C to 105 °C</b>						
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	38	150	35	210
<b>Turbidity</b>						
Turbidity	1	NTU	20	160	14	320
<b>Heavy Metals</b>						
Aluminium	0.05	mg/L	0.08	3.7	0.15	2.4
Arsenic	0.001	mg/L	< 0.001	0.008	< 0.001	0.021
Cadmium	0.0002	mg/L	< 0.0002	0.0007	< 0.0002	0.0004
Chromium	0.001	mg/L	< 0.001	0.001	< 0.001	0.002
Copper	0.001	mg/L	0.001	0.007	0.002	0.003
Iron	0.05	mg/L	3.9	32	2.0	180
Lead	0.001	mg/L	< 0.001	0.002	< 0.001	0.002

Client Sample ID			SW4A	SW5	SW6	SW7
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			M23-Fe0061433	M23-Fe0061434	M23-Fe0061435	M23-Fe0061436
Date Sampled			Feb 24, 2023	Feb 24, 2023	Feb 24, 2023	Feb 24, 2023
Test/Reference	LOR	Unit				
<b>Heavy Metals</b>						
Mercury	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel	0.001	mg/L	0.011	0.12	0.030	0.079
Zinc	0.005	mg/L	0.037	0.38	0.12	0.29

Client Sample ID			SW9	SW11	BASIN 1	BASIN 3
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			M23-Fe0061437	M23-Fe0061438	M23-Fe0061439	M23-Fe0061440
Date Sampled			Feb 24, 2023	Feb 24, 2023	Feb 24, 2023	Feb 24, 2023
Test/Reference	LOR	Unit				
<b>Total Recoverable Hydrocarbons</b>						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	0.1
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1) <sup>N04</sup>	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	0.05
TRH >C10-C16 less Naphthalene (F2) <sup>N01</sup>	0.05	mg/L	< 0.05	< 0.05	< 0.05	0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	0.15
<b>BTEX</b>						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	74	98	95	93
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>						
Naphthalene <sup>N02</sup>	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
<b>Polycyclic Aromatic Hydrocarbons</b>						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene <sup>N07</sup>	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1,2,3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001



Client Sample ID			SW9	SW11	BASIN 1	BASIN 3
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			M23- Fe0061437	M23- Fe0061438	M23- Fe0061439	M23- Fe0061440
Date Sampled			Feb 24, 2023	Feb 24, 2023	Feb 24, 2023	Feb 24, 2023
Test/Reference	LOR	Unit				
<b>Polycyclic Aromatic Hydrocarbons</b>						
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	70	92	85	108
p-Terphenyl-d14 (surr.)	1	%	53	119	53	79
<b>Ammonia (as N)</b>						
Ammonia (as N)	0.01	mg/L	0.31	0.80	0.24	1.8
<b>Biochemical Oxygen Demand (BOD-5 Day)</b>						
Biochemical Oxygen Demand (BOD-5 Day)	5	mg/L	< 5	< 5	< 5	6.6
<b>Conductivity (at 25 °C)</b>						
Conductivity (at 25 °C)	10	uS/cm	25000	2800	640	1400
<b>Nitrate &amp; Nitrite (as N)</b>						
Nitrate & Nitrite (as N)	0.05	mg/L	0.48	0.68	< 0.05	0.84
<b>pH (at 25 °C)</b>						
pH (at 25 °C)	0.1	pH Units	7.5	7.1	7.7	7.7
<b>Phosphate total (as P)</b>						
Phosphate total (as P)	0.01	mg/L	0.07	0.22	0.59	1.5
<b>Total Kjeldahl Nitrogen (as N)</b>						
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	0.6	2.7	2.3	5.0
<b>Total Nitrogen (as N)*</b>						
Total Nitrogen (as N)*	0.2	mg/L	1.08	3.38	2.3	5.84
<b>Total Suspended Solids Dried at 103 °C to 105 °C</b>						
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	190	430	20	28
<b>Turbidity</b>						
Turbidity	1	NTU	15	22	5.3	7.5
<b>Heavy Metals</b>						
<b>Aluminium</b>						
Aluminium	0.05	mg/L	0.40	1.8	0.07	0.21
<b>Arsenic</b>						
Arsenic	0.001	mg/L	0.001	0.002	0.004	0.004
<b>Cadmium</b>						
Cadmium	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
<b>Chromium</b>						
Chromium	0.001	mg/L	0.001	0.003	< 0.001	< 0.001
<b>Copper</b>						
Copper	0.001	mg/L	0.003	0.005	0.002	0.003
<b>Iron</b>						
Iron	0.05	mg/L	2.8	3.2	0.17	0.62
<b>Lead</b>						
Lead	0.001	mg/L	< 0.001	0.001	< 0.001	< 0.001
<b>Mercury</b>						
Mercury	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
<b>Nickel</b>						
Nickel	0.001	mg/L	0.002	0.037	< 0.001	0.032
<b>Zinc</b>						
Zinc	0.005	mg/L	0.013	0.079	0.007	0.057

**Sample History**

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

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

<b>Description</b>	<b>Testing Site</b>	<b>Extracted</b>	<b>Holding Time</b>
<b>Eurofins Suite B4</b>			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Feb 28, 2023	7 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Feb 28, 2023	7 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Feb 28, 2023	7 Days
<b>BTEX</b> - Method: LTM-ORG-2010 BTEX and Volatile TRH	Melbourne	Feb 28, 2023	14 Days
<b>Polycyclic Aromatic Hydrocarbons</b> - Method: LTM-ORG-2130 PAH and Phenols in Soil and Water	Melbourne	Feb 28, 2023	7 Days
<b>Ammonia (as N)</b> - Method: APHA 4500-NH3 Ammonia Nitrogen by FIA	Melbourne	Feb 28, 2023	28 Days
<b>Biochemical Oxygen Demand (BOD-5 Day)</b> - Method: LTM-INO-4010 Biochemical Oxygen Demand (BOD5) in Water	Melbourne	Feb 28, 2023	2 Days
<b>Conductivity (at 25 °C)</b> - Method: LTM-INO-4030 Conductivity	Melbourne	Feb 28, 2023	28 Days
<b>pH (at 25 °C)</b> - Method: LTM-GEN-7090 pH in water by ISE	Melbourne	Feb 28, 2023	0 Hours
<b>Total Suspended Solids Dried at 103 °C to 105 °C</b> - Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry	Melbourne	Feb 28, 2023	7 Days
<b>Turbidity</b> - Method: Turbidity by classical using APHA 2130B (LTM-INO-4140)	Melbourne	Mar 01, 2023	28 Days
<b>Heavy Metals</b> - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Melbourne	Mar 02, 2023	28 Days
<b>Total Nitrogen Set (as N)</b>			
<b>Nitrate &amp; Nitrite (as N)</b> - Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA	Melbourne	Feb 28, 2023	28 Days
<b>Total Kjeldahl Nitrogen (as N)</b> - Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA	Melbourne	Feb 28, 2023	28 Days
<b>Eurofins Suite B19A: Total N (TKN, NOx), Total P</b>			
<b>Phosphate total (as P)</b> - Method: LTM-INO-4040 Phosphate by CFA	Melbourne	Feb 28, 2023	28 Days

ABN: 50 005 085 521

ABN: 91 05 0159 898

NZBN: 9429046024954

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<b>Company Name:</b>	GHD Pty Ltd NEWCASTLE	<b>Order No.:</b>		<b>Received:</b>	Feb 24, 2023 11:45 AM
<b>Address:</b>	3/24 Honeysuckle Dve Newcastle NSW 2300	<b>Report #:</b>	967060	<b>Due:</b>	Mar 3, 2023
<b>Project Name:</b>	AURIZON HEXHAM WATER MONITORING	<b>Phone:</b>	02 4979 9999	<b>Priority:</b>	5 Day
<b>Project ID:</b>	12584780	<b>Fax:</b>	02 4979 9988	<b>Contact Name:</b>	Leslie Maranciak

**Eurofins Analytical Services Manager : Andrew Black**

Sample Detail						Aluminium	Ammonia (as N)	Arsenic	Biochemical Oxygen Demand (BOD-5 Day)	Cadmium	Chromium	Conductivity (at 25 °C)	Copper	Iron	Lead	Mercury	Nickel	pH (at 25 °C)	Total Suspended Solids Dried at 103 °C to 105 °C	Turbidity	Zinc	Eurofins Suite B4	Eurofins Suite B19A: Total N (TKN, NO <sub>x</sub> ), Total P
<b>Melbourne Laboratory - NATA # 1261 Site # 1254</b>						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<b>External Laboratory</b>																							
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID																		
1	SW1	Feb 24, 2023		Water	M23-Fe0061429	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2	SW2	Feb 24, 2023		Water	M23-Fe0061430	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3	SW3	Feb 24, 2023		Water	M23-Fe0061431	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4	SW4	Feb 24, 2023		Water	M23-Fe0061432	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5	SW4A	Feb 24, 2023		Water	M23-Fe0061433	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6	SW5	Feb 24, 2023		Water	M23-Fe0061434	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
7	SW6	Feb 24, 2023		Water	M23-Fe0061435	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8	SW7	Feb 24, 2023		Water	M23-Fe0061436	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
9	SW9	Feb 24, 2023		Water	M23-Fe0061437	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10	SW11	Feb 24, 2023		Water	M23-Fe0061438	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
11	BASIN 1	Feb 24, 2023		Water	M23-Fe0061439	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
12	BASIN 3	Feb 24, 2023		Water	M23-Fe0061440	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<b>Test Counts</b>						12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12

## Internal Quality Control Review and Glossary

### General

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

### Holding Times

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

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

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

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

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

### Units

**mg/kg:** milligrams per kilogram

**mg/L:** milligrams per litre

**µg/L:** micrograms per litre

**ppm:** parts per million

**ppb:** parts per billion

**%:** Percentage

**org/100 mL:** Organisms per 100 millilitres

**NTU:** Nephelometric Turbidity Units

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

**CFU:** Colony forming unit

### Terms

<b>APHA</b>	American Public Health Association
<b>COC</b>	Chain of Custody
<b>CP</b>	Client Parent - QC was performed on samples pertaining to this report
<b>CRM</b>	Certified Reference Material (ISO17034) - reported as percent recovery.
<b>Dry</b>	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
<b>Duplicate</b>	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
<b>LOR</b>	Limit of Reporting.
<b>LCS</b>	Laboratory Control Sample - reported as percent recovery.
<b>Method Blank</b>	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
<b>NCP</b>	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
<b>RPD</b>	Relative Percent Difference between two Duplicate pieces of analysis.
<b>SPIKE</b>	Addition of the analyte to the sample and reported as percentage recovery.
<b>SRA</b>	Sample Receipt Advice
<b>Surr - Surrogate</b>	The addition of a like compound to the analyte target and reported as percentage recovery.
<b>TBTO</b>	Tributyltin oxide ( <i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
<b>TCLP</b>	Toxicity Characteristic Leaching Procedure
<b>TEQ</b>	Toxic Equivalency Quotient or Total Equivalence
<b>QSM</b>	US Department of Defense Quality Systems Manual Version 5.4
<b>US EPA</b>	United States Environmental Protection Agency
<b>WA DWER</b>	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

### QC - Acceptance Criteria

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

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

Results <10 times the LOR: No Limit

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

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

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

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

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

### QC Data General Comments

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

**Quality Control Results**

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Method Blank</b>							
<b>Total Recoverable Hydrocarbons</b>							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
<b>Method Blank</b>							
<b>BTEX</b>							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total*	mg/L	< 0.003			0.003	Pass	
<b>Method Blank</b>							
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>							
Naphthalene	mg/L	< 0.01			0.01	Pass	
<b>Method Blank</b>							
<b>Polycyclic Aromatic Hydrocarbons</b>							
Acenaphthene	mg/L	< 0.001			0.001	Pass	
Acenaphthylene	mg/L	< 0.001			0.001	Pass	
Anthracene	mg/L	< 0.001			0.001	Pass	
Benz(a)anthracene	mg/L	< 0.001			0.001	Pass	
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.001			0.001	Pass	
Benzo(g,h,i)perylene	mg/L	< 0.001			0.001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.001			0.001	Pass	
Chrysene	mg/L	< 0.001			0.001	Pass	
Dibenz(a,h)anthracene	mg/L	< 0.001			0.001	Pass	
Fluoranthene	mg/L	< 0.001			0.001	Pass	
Fluorene	mg/L	< 0.001			0.001	Pass	
Indeno(1,2,3-cd)pyrene	mg/L	< 0.001			0.001	Pass	
Naphthalene	mg/L	< 0.001			0.001	Pass	
Phenanthrene	mg/L	< 0.001			0.001	Pass	
Pyrene	mg/L	< 0.001			0.001	Pass	
<b>Method Blank</b>							
Ammonia (as N)	mg/L	< 0.01			0.01	Pass	
Biochemical Oxygen Demand (BOD-5 Day)	mg/L	< 5			5	Pass	
Nitrate & Nitrite (as N)	mg/L	< 0.05			0.05	Pass	
Phosphate total (as P)	mg/L	< 0.01			0.01	Pass	
Total Kjeldahl Nitrogen (as N)	mg/L	< 0.2			0.2	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	mg/L	< 5			5	Pass	
Turbidity	NTU	< 1			1	Pass	
<b>Method Blank</b>							
<b>Heavy Metals</b>							
Aluminium	mg/L	< 0.05			0.05	Pass	
Arsenic	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	

Test	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Chromium	mg/L	< 0.001		0.001	Pass	
Copper	mg/L	< 0.001		0.001	Pass	
Iron	mg/L	< 0.05		0.05	Pass	
Lead	mg/L	< 0.001		0.001	Pass	
Mercury	mg/L	< 0.0001		0.0001	Pass	
Nickel	mg/L	< 0.001		0.001	Pass	
Zinc	mg/L	< 0.005		0.005	Pass	
<b>LCS - % Recovery</b>						
<b>Total Recoverable Hydrocarbons</b>						
TRH C6-C9	%	118		70-130	Pass	
TRH C10-C14	%	120		70-130	Pass	
TRH C6-C10	%	123		70-130	Pass	
TRH >C10-C16	%	119		70-130	Pass	
<b>LCS - % Recovery</b>						
<b>BTEX</b>						
Benzene	%	109		70-130	Pass	
Toluene	%	105		70-130	Pass	
Ethylbenzene	%	110		70-130	Pass	
m&p-Xylenes	%	112		70-130	Pass	
Xylenes - Total*	%	111		70-130	Pass	
<b>LCS - % Recovery</b>						
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>						
Naphthalene	%	97		70-130	Pass	
<b>LCS - % Recovery</b>						
<b>Polycyclic Aromatic Hydrocarbons</b>						
Acenaphthene	%	71		70-130	Pass	
Acenaphthylene	%	77		70-130	Pass	
Anthracene	%	77		70-130	Pass	
Benz(a)anthracene	%	91		70-130	Pass	
Benzo(a)pyrene	%	72		70-130	Pass	
Benzo(b&j)fluoranthene	%	100		70-130	Pass	
Benzo(g,h,i)perylene	%	107		70-130	Pass	
Benzo(k)fluoranthene	%	115		70-130	Pass	
Chrysene	%	97		70-130	Pass	
Dibenz(a,h)anthracene	%	109		70-130	Pass	
Fluoranthene	%	77		70-130	Pass	
Fluorene	%	90		70-130	Pass	
Indeno(1,2,3-cd)pyrene	%	110		70-130	Pass	
Naphthalene	%	87		70-130	Pass	
Phenanthrene	%	82		70-130	Pass	
Pyrene	%	84		70-130	Pass	
<b>LCS - % Recovery</b>						
Ammonia (as N)	%	84		70-130	Pass	
Conductivity (at 25 °C)	%	101		70-130	Pass	
Nitrate & Nitrite (as N)	%	113		70-130	Pass	
Phosphate total (as P)	%	91		70-130	Pass	
Total Kjeldahl Nitrogen (as N)	%	72		70-130	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	%	97		70-130	Pass	
<b>LCS - % Recovery</b>						
<b>Heavy Metals</b>						
Aluminium	%	91		80-120	Pass	
Arsenic	%	88		80-120	Pass	
Cadmium	%	86		80-120	Pass	
Chromium	%	86		80-120	Pass	

Test			Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Copper			%	87		80-120	Pass	
Iron			%	95		80-120	Pass	
Lead			%	81		80-120	Pass	
Mercury			%	87		80-120	Pass	
Nickel			%	86		80-120	Pass	
Zinc			%	91		80-120	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
<b>Spike - % Recovery</b>								
<b>Total Recoverable Hydrocarbons</b>				Result 1				
TRH C10-C14	M23-Ma0010129	NCP	%	108		70-130	Pass	
TRH >C10-C16	M23-Ma0010129	NCP	%	108		70-130	Pass	
<b>Spike - % Recovery</b>								
<b>Polycyclic Aromatic Hydrocarbons</b>				Result 1				
Acenaphthene	M23-Fe0000552	NCP	%	91		70-130	Pass	
Acenaphthylene	M23-Fe0000552	NCP	%	103		70-130	Pass	
Anthracene	M23-Fe0000552	NCP	%	93		70-130	Pass	
Benz(a)anthracene	M23-Fe0000552	NCP	%	118		70-130	Pass	
Benzo(a)pyrene	M23-Fe0000552	NCP	%	99		70-130	Pass	
Benzo(b&j)fluoranthene	M23-Fe0000552	NCP	%	106		70-130	Pass	
Benzo(g,h,i)perylene	M23-Fe0000552	NCP	%	80		70-130	Pass	
Benzo(k)fluoranthene	M23-Fe0000552	NCP	%	116		70-130	Pass	
Chrysene	M23-Fe0000552	NCP	%	124		70-130	Pass	
Dibenz(a,h)anthracene	M23-Fe0000552	NCP	%	86		70-130	Pass	
Fluoranthene	M23-Fe0000552	NCP	%	101		70-130	Pass	
Fluorene	M23-Fe0000552	NCP	%	116		70-130	Pass	
Indeno(1,2,3-cd)pyrene	M23-Fe0000552	NCP	%	89		70-130	Pass	
Naphthalene	M23-Fe0000552	NCP	%	79		70-130	Pass	
Phenanthrene	M23-Fe0000552	NCP	%	107		70-130	Pass	
Pyrene	M23-Fe0000552	NCP	%	105		70-130	Pass	
<b>Spike - % Recovery</b>								
				Result 1				
Ammonia (as N)	S23-Fe0058832	NCP	%	70		70-130	Pass	
Nitrate & Nitrite (as N)	S23-Fe0058832	NCP	%	116		70-130	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	N23-Fe0064259	NCP	%	99		70-130	Pass	
<b>Spike - % Recovery</b>								
				Result 1				
Total Kjeldahl Nitrogen (as N)	M23-Fe0061432	CP	%	74		70-130	Pass	
<b>Spike - % Recovery</b>								
<b>Heavy Metals</b>				Result 1				
Aluminium	M23-Fe0061433	CP	%	103		75-125	Pass	
Arsenic	M23-Fe0061433	CP	%	99		75-125	Pass	
Cadmium	M23-Fe0061433	CP	%	94		75-125	Pass	
Chromium	M23-Fe0061433	CP	%	96		75-125	Pass	
Copper	M23-Fe0061433	CP	%	92		75-125	Pass	
Iron	M23-Fe0061433	CP	%	58		75-125	Fail	Q08
Lead	M23-Fe0061433	CP	%	82		75-125	Pass	
Mercury	M23-Fe0061433	CP	%	90		75-125	Pass	
Nickel	M23-Fe0061433	CP	%	90		75-125	Pass	
<b>Spike - % Recovery</b>								
<b>Total Recoverable Hydrocarbons</b>				Result 1				
TRH C6-C9	M23-Ma0003385	NCP	%	118		70-130	Pass	
TRH C6-C10	M23-Ma0003385	NCP	%	113		70-130	Pass	
<b>Spike - % Recovery</b>								

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>BTEX</b>									
				Result 1					
Benzene	M23-Ma0003385	NCP	%	95			70-130	Pass	
Toluene	M23-Ma0003385	NCP	%	92			70-130	Pass	
Ethylbenzene	M23-Ma0003385	NCP	%	100			70-130	Pass	
m&p-Xylenes	M23-Ma0003385	NCP	%	104			70-130	Pass	
o-Xylene	M23-Ma0003385	NCP	%	103			70-130	Pass	
Xylenes - Total*	M23-Ma0003385	NCP	%	103			70-130	Pass	
<b>Spike - % Recovery</b>									
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>				Result 1					
Naphthalene	M23-Ma0003385	NCP	%	110			70-130	Pass	
<b>Spike - % Recovery</b>									
<b>Heavy Metals</b>				Result 1					
Aluminium	M23-Fe0061438	CP	%	81			75-125	Pass	
Arsenic	M23-Fe0061438	CP	%	104			75-125	Pass	
Cadmium	M23-Fe0061438	CP	%	100			75-125	Pass	
Chromium	M23-Fe0061438	CP	%	100			75-125	Pass	
Copper	M23-Fe0061438	CP	%	97			75-125	Pass	
Iron	M23-Fe0061438	CP	%	65			75-125	Fail	Q08
Lead	M23-Fe0061438	CP	%	92			75-125	Pass	
Mercury	M23-Fe0061438	CP	%	115			75-125	Pass	
Nickel	M23-Fe0061438	CP	%	91			75-125	Pass	
Zinc	M23-Fe0061438	CP	%	88			75-125	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Duplicate</b>									
<b>Polycyclic Aromatic Hydrocarbons</b>				Result 1	Result 2	RPD			
Acenaphthene	M23-Fe0059191	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Acenaphthylene	M23-Fe0059191	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Anthracene	M23-Fe0059191	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benz(a)anthracene	M23-Fe0059191	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(a)pyrene	M23-Fe0059191	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(b&j)fluoranthene	M23-Fe0059191	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(g,h,i)perylene	M23-Fe0059191	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(k)fluoranthene	M23-Fe0059191	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Chrysene	M23-Fe0059191	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Dibenz(a,h)anthracene	M23-Fe0059191	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluoranthene	M23-Fe0059191	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluorene	M23-Fe0059191	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Indeno(1,2,3-cd)pyrene	M23-Fe0059191	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Naphthalene	M23-Fe0059191	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Phenanthrene	M23-Fe0059191	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Pyrene	M23-Fe0059191	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
<b>Duplicate</b>									
				Result 1	Result 2	RPD			
Ammonia (as N)	B23-Fe0060307	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Conductivity (at 25 °C)	M23-Fe0064203	NCP	uS/cm	890	880	<1	30%	Pass	
Nitrate & Nitrite (as N)	B23-Fe0060307	NCP	mg/L	0.47	0.47	<1	30%	Pass	
Total Kjeldahl Nitrogen (as N)	M23-Fe0061429	CP	mg/L	1.7	0.6	92	30%	Fail	Q15
Total Suspended Solids Dried at 103 °C to 105 °C	N23-Fe0064316	NCP	mg/L	14	13	12	30%	Pass	
Turbidity	M23-Fe0061429	CP	NTU	150	150	<1	30%	Pass	
<b>Duplicate</b>									
				Result 1	Result 2	RPD			
Total Kjeldahl Nitrogen (as N)	M23-Fe0061430	CP	mg/L	2.7	2.3	16	30%	Pass	



Duplicate								
				Result 1	Result 2	RPD		
Biochemical Oxygen Demand (BOD-5 Day)	M23-Fe0061431	CP	mg/L	< 5	< 5	<1	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Aluminium	M23-Fe0061433	CP	mg/L	0.08	0.08	5.7	30%	Pass
Arsenic	M23-Fe0061433	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Cadmium	M23-Fe0061433	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Chromium	M23-Fe0061433	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Copper	M23-Fe0061433	CP	mg/L	0.001	0.001	1.7	30%	Pass
Iron	M23-Fe0061433	CP	mg/L	3.9	3.9	<1	30%	Pass
Lead	M23-Fe0061433	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Mercury	M23-Fe0061433	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Nickel	M23-Fe0061433	CP	mg/L	0.011	0.012	7.5	30%	Pass
Zinc	M23-Fe0061433	CP	mg/L	0.037	0.039	5.2	30%	Pass
Duplicate								
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD		
TRH C10-C14	M23-Fe0061437	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass
TRH C15-C28	M23-Fe0061437	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass
TRH C29-C36	M23-Fe0061437	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass
TRH >C10-C16	M23-Fe0061437	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass
TRH >C16-C34	M23-Fe0061437	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass
TRH >C34-C40	M23-Fe0061437	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Phosphate total (as P)	M23-Fe0061437	CP	mg/L	0.07	0.08	11	30%	Pass
Duplicate								
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD		
TRH C6-C9	M23-Ma0003256	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass
TRH C6-C10	M23-Ma0003256	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass
Duplicate								
BTEX				Result 1	Result 2	RPD		
Benzene	M23-Ma0003256	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Toluene	M23-Ma0003256	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Ethylbenzene	M23-Ma0003256	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
m&p-Xylenes	M23-Ma0003256	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass
o-Xylene	M23-Ma0003256	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Xylenes - Total*	M23-Ma0003256	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass
Duplicate								
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD		
Naphthalene	M23-Ma0003256	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Phosphate total (as P)	M23-Fe0061438	CP	mg/L	0.22	0.22	<1	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Aluminium	M23-Fe0061438	CP	mg/L	1.8	1.8	1.4	30%	Pass
Arsenic	M23-Fe0061438	CP	mg/L	0.002	0.002	9.4	30%	Pass
Cadmium	M23-Fe0061438	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Chromium	M23-Fe0061438	CP	mg/L	0.003	0.003	3.1	30%	Pass
Copper	M23-Fe0061438	CP	mg/L	0.005	0.004	15	30%	Pass
Iron	M23-Fe0061438	CP	mg/L	3.2	3.3	1.4	30%	Pass
Lead	M23-Fe0061438	CP	mg/L	0.001	0.001	2.1	30%	Pass
Mercury	M23-Fe0061438	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Nickel	M23-Fe0061438	CP	mg/L	0.037	0.037	<1	30%	Pass
Zinc	M23-Fe0061438	CP	mg/L	0.079	0.077	1.6	30%	Pass

**Comments**
**Sample Integrity**

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	Yes

**Qualifier Codes/Comments**

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q08	The matrix spike recovery is outside of the recommended acceptance criteria. An acceptable recovery was obtained for the laboratory control sample indicating a sample matrix interference.
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

**Authorised by:**

Andrew Black	Analytical Services Manager
Carroll Lee	Senior Analyst-Organic
Edward Lee	Senior Analyst-Organic
Emily Rosenberg	Senior Analyst-Metal
Harry Bacalis	Senior Analyst-Volatile
Joseph Edouard	Senior Analyst-Organic
Joseph Edouard	Senior Analyst-Volatile
Mary Makarios	Senior Analyst-Inorganic
Mary Makarios	Senior Analyst-Metal
Scott Beddoes	Senior Analyst-Inorganic
Scott Beddoes	Senior Analyst-Metal



**Glenn Jackson**  
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

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

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

**Eurofins Environment Testing Australia Pty Ltd**

ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road Dandenong South VIC 3175 Tel: +61 3 8564 5000 NATA# 1261 Site# 1254	19/8 Lewalan Street Grovedale VIC 3216 Tel: +61 3 8564 5000 NATA# 1261 Site# 25403	179 Magowar Road Girraween NSW 2145 Tel: +61 2 9900 8400 NATA# 1261 Site# 18217	Unit 1,2 Dacre Street Mitchell ACT 2911 Tel: +61 2 6113 8091 NATA# 1261 Site# 25466	1/21 Smallwood Place Murarrie QLD 4172 Tel: +61 7 3902 4600 NATA# 1261 Site# 20794	1/2 Frost Drive Mayfield West NSW 2304 Tel: +61 2 4968 8448 NATA# 1261 Site# 25079 & 25289

**Eurofins ARL Pty Ltd**

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Perth
46-48 Banksia Road Welshpool WA 6106 Tel: +61 8 6253 4444 NATA# 2377 Site# 2370

**Eurofins Environment Testing NZ Ltd**

NZBN: 9429046024954

Auckland	Christchurch
35 O'Rorke Road Penrose, Auckland 1061 Tel: +64 9 526 45 51 IANZ# 1327	43 Detroit Drive Rolleston, Christchurch 7675 Tel: 0800 856 450 IANZ# 1290

## Sample Receipt Advice

<b>Company name:</b>	GHD Pty Ltd NEWCASTLE
<b>Contact name:</b>	Leslie Maranciak
<b>Project name:</b>	AURIZON HEXHAM WATER MONITORING
<b>Project ID:</b>	12584780
<b>Turnaround time:</b>	5 Day
<b>Date/Time received</b>	Feb 24, 2023 11:45 AM
<b>Eurofins reference</b>	967060

## Sample Information

- ✓ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ✓ Sample Temperature of chilled sample on the batch as recorded by Eurofins Sample Receipt : 12.2 degrees Celsius.
- ✓ All samples have been received as described on the above COC.
- ✓ COC has been completed correctly.
- ✓ Attempt to chill was evident.
- ✓ Appropriately preserved sample containers have been used.
- ✓ All samples were received in good condition.
- ✓ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ✓ Appropriate sample containers have been used.
- ✓ Sample containers for volatile analysis received with zero headspace.
- ✗ Split sample sent to requested external lab.
- ✓ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

## Notes

## Contact

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

**Andrew Black on phone : (+61) 2 9900 8490 or by email: AndrewBlack@eurofins.com**

Results will be delivered electronically via email to Leslie Maranciak - leslie.maranciak@ghd.com.

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

### CHAIN OF CUSTODY RECORD

<b>CLIENT DETAILS</b>		Page 1 of 1	
<b>Company Name:</b> GHD	<b>Contact Name:</b> Lachlan Parkinson	<b>Purchase Order:</b> 12584780	<b>COC Number:</b>
<b>Office Address:</b> L3, 24 Honeysuckle Drive Newcastle 2300	<b>Project Manager:</b> Leslie Maranciak	<b>PROJECT Number:</b> 12584780	<b>Eurofins   mgt quote ID:</b> 180501GHD
	<b>Email for results:</b> Leslie.Maranciak@ghd.com Lachlan.Parkinson@ghd.com	<b>PROJECT Name:</b> Aurizon Hexham Water Monitoring	<b>Data output format:</b> ESDAT

<b>Special Directions &amp; Comments:</b> <div style="background-color: yellow; padding: 5px; color: red; font-weight: bold;">Please ensure fecal coliforms are reported in CFU/100ml</div>	<b>Analytes</b>				Some common holding times (with correct preservation). For further information contact the lab				
	B4 (BTEXN / TRH / PAH) Total Metals (Al, As, Cd, Cr, Cu, Fe, Pb, Hg, Ni, Zn) pH, Conductivity, Turbidity, Suspended Solids Ammonia Sulph B19A (Nitrites, Total N (TKN, NOX), Total P Thermotolerant Coliforms (CFU/100ml) BOD 5 Day	<b>Waters</b>		<b>Soils</b>					
		BTEX, MAH, VOC	14 days	BTEX, MAH, VOC	14 days				

Sample ID	Date	Matrix	Analytes												Containers:						Sample comments:				
			B4 (BTEXN / TRH / PAH)	Total Metals (Al, As, Cd, Cr, Cu, Fe, Pb, Hg, Ni, Zn)	pH, Conductivity, Turbidity, Suspended Solids	Ammonia	Sulph B19A (Nitrites, Total N (TKN, NOX), Total P	Thermotolerant Coliforms (CFU/100ml)	BOD 5 Day	1LP	250P	125P	1LA	40mL wal	125mL A	Jar									
1	24/02/2023	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X									
2	24/02/2023	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X									
3	24/02/2023	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X									
4	24/02/2023	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X									
5	24/02/2023	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X									
6	24/02/2023	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X									
7	24/02/2023	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X									
8	24/02/2023	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X									
9	24/02/2023	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X									
10	24/02/2023	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X									
11	24/02/2023	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X									
12	24/02/2023	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X									
13	24/02/2023	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X									
14	24/02/2023	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X									
15	24/02/2023	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X									
16																									
17																									
18																									
19																									
20																									

<b>Relinquished By:</b> L.parkinson	<b>Received By:</b> <i>Deidra Stoyan</i>	<b>Turn around time:</b>	<b>Method Of Shipment:</b>	<b>Temperature on arrival:</b>
<b>Date &amp; Time:</b> 24/2/2023	<b>Date &amp; Time:</b> 24/2/23 11:45 AM	1 DAY <input type="checkbox"/> 2 DAY <input type="checkbox"/> 3 DAY <input type="checkbox"/> 5 DAY <input checked="" type="checkbox"/> 10 DAY <input type="checkbox"/> Other:	<input type="checkbox"/> Courier <input checked="" type="checkbox"/> Hand Delivered <input type="checkbox"/> Postal Courier Consignment #:	12.2
<b>Signature:</b> <i>[Signature]</i>	<b>Signature:</b> <i>[Signature]</i>			<b>Report number:</b> 967060

## Tyrone Gowans

---

**From:** Lachlan Parkinson <Lachlan.Parkinson@ghd.com>  
**Sent:** Monday, 27 February 2023 2:28 PM  
**To:** #AU\_CAU001\_EnviroSampleVic  
**Cc:** Leslie Maranciak; Andrew Black  
**Subject:** RE: Eurofins Sample Receipt Advice - Report 967060 : Site AURIZON HEXHAM WATER MONITORING (12584780)

**Follow Up Flag:** Follow up  
**Flag Status:** Completed

**CAUTION: EXTERNAL EMAIL** - Sent from an email domain that is not formally trusted by Eurofins.

Do not click on links or open attachments unless you recognise the sender and are certain that the content is safe.

Thanks Jake.

This is all correct apart from the Thermotolerant Coliforms (CFU) analysis. Please take ALL of these off the list for analysis.

We have taken these samples away and won't get any coliforms tested in this batch as they would have been out of holding.

Thanks,

**Lachlan Parkinson**  
B.Env. Sci. & Management  
Environmental Scientist – Contamination Assessment and Remediation

### GHD

GHD - Proudly employee-owned | [ghd.com](https://ghd.com)  
Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle, NSW, 2300, Australia  
D +61 2 49107720 E [Lachlan.Parkinson@ghd.com](mailto:Lachlan.Parkinson@ghd.com)

→ The Power of Commitment

Connect



Please consider the environment before printing this email

---

**From:** EnviroSampleVic@eurofins.com <EnviroSampleVic@eurofins.com>  
**Sent:** Monday, 27 February 2023 2:10 PM  
**To:** Leslie Maranciak <leslie.maranciak@ghd.com>  
**Cc:** Lachlan Parkinson <lachlan.parkinson@ghd.com>  
**Subject:** Eurofins Sample Receipt Advice - Report 967060 : Site AURIZON HEXHAM WATER MONITORING (12584780)

Dear Valued Client,

Please find attached a Sample Receipt Advice (SRA), a Summary Sheet and a scanned copy of your Chain-of-Custody (COC). It is important that you check this documentation to ensure that the details are correct such as the Client Job Number, Turn Around Time, any comments in the Notes section and sample numbers as well as the requested

GHD Pty Ltd  
3/24 Honeysuckle Dve  
Newcastle  
NSW 2300



NATA Accredited  
Accreditation Number 1261  
Site Number 25079 & 25289

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

Attention: Lachlan Parkinson

Report 967490-W  
Project name Aurizon Hexham Water Monitoring  
Project ID 12584780  
Received Date Feb 28, 2023

Client Sample ID			SW1	SW2	SW3	SW4
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			X23-Fe0064458	X23-Fe0064459	X23-Fe0064460	X23-Fe0064461
Date Sampled			Feb 28, 2023	Feb 28, 2023	Feb 28, 2023	Feb 28, 2023
Test/Reference	LOR	Unit				
Thermotolerant Coliforms	1	CFU/100mL	5300	12455	144	6900

Client Sample ID			SW4A	SW5	SW6	SW7
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			X23-Fe0064462	X23-Fe0064463	X23-Fe0064464	X23-Fe0064465
Date Sampled			Feb 28, 2023	Feb 28, 2023	Feb 28, 2023	Feb 28, 2023
Test/Reference	LOR	Unit				
Thermotolerant Coliforms	1	CFU/100mL	68000	2500	196000	510

Client Sample ID			SW9	SW11	Basin 1	Basin 3
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			X23-Fe0064466	X23-Fe0064467	X23-Fe0064468	X23-Fe0064469
Date Sampled			Feb 28, 2023	Feb 28, 2023	Feb 28, 2023	Feb 28, 2023
Test/Reference	LOR	Unit				
Thermotolerant Coliforms	1	CFU/100mL	55	7100	830	727

**Sample History**

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

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

**Description**

Thermotolerant Coliforms

**Testing Site**

Newcastle

**Extracted**

Mar 02, 2023

**Holding Time**

24 Hours

- Method: AS 4276.5 (in-house method LTM-MIC-6010)

## Internal Quality Control Review and Glossary

### General

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

### Holding Times

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

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

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

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

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

### Units

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

### Terms

<b>APHA</b>	American Public Health Association
<b>COC</b>	Chain of Custody
<b>CP</b>	Client Parent - QC was performed on samples pertaining to this report
<b>CRM</b>	Certified Reference Material (ISO17034) - reported as percent recovery.
<b>Dry</b>	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
<b>Duplicate</b>	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
<b>LOR</b>	Limit of Reporting.
<b>LCS</b>	Laboratory Control Sample - reported as percent recovery.
<b>Method Blank</b>	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
<b>NCP</b>	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
<b>RPD</b>	Relative Percent Difference between two Duplicate pieces of analysis.
<b>SPIKE</b>	Addition of the analyte to the sample and reported as percentage recovery.
<b>SRA</b>	Sample Receipt Advice
<b>Surr - Surrogate</b>	The addition of a like compound to the analyte target and reported as percentage recovery.
<b>TBTO</b>	Tributyltin oxide ( <i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
<b>TCLP</b>	Toxicity Characteristic Leaching Procedure
<b>TEQ</b>	Toxic Equivalency Quotient or Total Equivalence
<b>QSM</b>	US Department of Defense Quality Systems Manual Version 5.4
<b>US EPA</b>	United States Environmental Protection Agency
<b>WA DWER</b>	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

### QC - Acceptance Criteria

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

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

Results <10 times the LOR: No Limit

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

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

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

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

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

### QC Data General Comments

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



**Comments****Sample Integrity**

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

**Authorised by:**

Kirra Bailey

Analytical Services Manager

**Shay Xie****General Manager**

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

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

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**CHAIN OF CUSTODY RECORD**

CLIENT DETAILS Page 1 of 1

Company Name : GHD	Contact Name: Lachlan Parkinson	Purchase Order : 12584780	COC Number :
Office Address : L3, 24 Honeysuckle Drive  Newcastle 2300	Project Manager : Leslie Maranciak	PROJECT Number : 12584780	Eurofins   mgt quote ID : 180501GHD
	Email for results : <a href="mailto:Leslie.Maranciak@ghd.com">Leslie.Maranciak@ghd.com</a> <a href="mailto:Lachlan.Parkinson@ghd.com">Lachlan.Parkinson@ghd.com</a>	PROJECT Name : Aurizon Hexham Water Monitoring	Data output format: ESDAT

<p><b>Special Directions &amp; Comments :</b></p> <div style="background-color: yellow; padding: 5px; color: red; font-weight: bold;">Please ensure fecal coliforms are reported in CFU/100ml</div> <p>Eurofins   mgt DI water batch number:</p>	<p><b>Analytes</b></p>	<p style="text-align: center;">Some common holding times (with correct preservation). For further information contact the lab</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">Waters</th> <th colspan="2">Soils</th> </tr> </thead> <tbody> <tr> <td>BTEX, MAH, VOC</td> <td>14 days</td> <td>BTEX, MAH, VOC</td> <td>14 days</td> </tr> <tr> <td>TRH, PAH, Phenols, Pesticides</td> <td>7 days</td> <td>TRH, PAH, Phenols, Pesticides</td> <td>14 days</td> </tr> <tr> <td>Heavy Metals</td> <td>6 months</td> <td>Heavy Metals</td> <td>6 months</td> </tr> <tr> <td>Mercury, CrVI</td> <td>28 days</td> <td>Mercury, CrVI</td> <td>28 days</td> </tr> <tr> <td>Microbiological testing</td> <td>24 hours</td> <td>Microbiological testing</td> <td>72 hours</td> </tr> <tr> <td>BOD, Nitrate, Nitrite, Total N</td> <td>2 days</td> <td>Anions</td> <td>28 days</td> </tr> <tr> <td>Solids - TSS, TDS etc</td> <td>7 days</td> <td>SPOCAS, pH Field and FOX, CrS</td> <td>24 hours</td> </tr> <tr> <td>Ferrous iron</td> <td>7 days</td> <td>ASLP, TCLP</td> <td>7 days</td> </tr> </tbody> </table>	Waters		Soils		BTEX, MAH, VOC	14 days	BTEX, MAH, VOC	14 days	TRH, PAH, Phenols, Pesticides	7 days	TRH, PAH, Phenols, Pesticides	14 days	Heavy Metals	6 months	Heavy Metals	6 months	Mercury, CrVI	28 days	Mercury, CrVI	28 days	Microbiological testing	24 hours	Microbiological testing	72 hours	BOD, Nitrate, Nitrite, Total N	2 days	Anions	28 days	Solids - TSS, TDS etc	7 days	SPOCAS, pH Field and FOX, CrS	24 hours	Ferrous iron	7 days	ASLP, TCLP	7 days
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Sample ID	Date	Matrix	Containers:											Sample comments:			
			1LP	250P	125P	1LA	40ml vial	125ml A	Jar								
1	SW1	28/02/2023	W														
2	SW2	28/02/2023	W														
3	SW3	28/02/2023	W														
4	SW4	28/02/2023	W														
5	SW4A	28/02/2023	W														
6	SW5	28/02/2023	W														
7	SW6	28/02/2023	W														
8	SW7	28/02/2023	W														
<del>9</del>	<del>SW8</del>	<del>28/02/2023</del>	<del>W</del>														
10	SW9	28/02/2023	W														
<del>11</del>	<del>SW10</del>	<del>28/02/2023</del>	<del>W</del>														
12	SW11	28/02/2023	W														
13	Basin 1	28/02/2023	W														
<del>14</del>	<del>Basin 2</del>	<del>28/02/2023</del>	<del>W</del>														
15	Basin 3	28/02/2023	W														
16																	
17																	
18																	
19																	
20																	

Relinquished By: <i>L Parkinson</i>	Received By: <i>David Stinson</i>	Turn around time	Method Of Shipment	Temperature on arrival:
Date & Time: 28/2/23	Date & Time: 28/2/23, 2:00PM	1 DAY <input type="checkbox"/> 2 DAY <input type="checkbox"/> 3 DAY <input type="checkbox"/> 5 DAY <input checked="" type="checkbox"/> 10 DAY <input type="checkbox"/> Other:	<input type="checkbox"/> Courier <input checked="" type="checkbox"/> Hand Delivered <input type="checkbox"/> Postal Courier Consignment # :	Report number:
Signature: <i>M</i>	Signature: <i>[Signature]</i>			

967490

GHD Pty Ltd  
3/24 Honeysuckle Dve  
Newcastle  
NSW 2300



NATA Accredited  
Accreditation Number 1261  
Site Number 18217

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

Attention: Leslie Maranciak

Report 974247-W  
Project name AURIZON HEXHAM WATER MONITORING  
Project ID 12584780  
Received Date Mar 22, 2023

Client Sample ID			MW01R	101R	MW101R	MW106R
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N23- Ma0052124	N23- Ma0052125	N23- Ma0052126	N23- Ma0052127
Date Sampled			Mar 22, 2023	Mar 22, 2023	Mar 22, 2023	Mar 22, 2023
Test/Reference	LOR	Unit				
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
<b>BTEX</b>						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	75	72	70	71
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>						
Naphthalene <sup>N02</sup>	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH >C10-C16 less Naphthalene (F2) <sup>N01</sup>	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C6-C10	0.02	mg/L	0.05	< 0.02	0.03	0.02
TRH C6-C10 less BTEX (F1) <sup>N04</sup>	0.02	mg/L	0.05	< 0.02	0.03	0.02
<b>Polycyclic Aromatic Hydrocarbons</b>						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene <sup>N07</sup>	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1,2,3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001

Client Sample ID			MW01R	101R	MW101R	MW106R
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N23- Ma0052124	N23- Ma0052125	N23- Ma0052126	N23- Ma0052127
Date Sampled			Mar 22, 2023	Mar 22, 2023	Mar 22, 2023	Mar 22, 2023
Test/Reference	LOR	Unit				
<b>Polycyclic Aromatic Hydrocarbons</b>						
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	<sup>Q09</sup> INT	<sup>Q09</sup> INT	<sup>Q09</sup> INT	<sup>Q09</sup> INT
p-Terphenyl-d14 (surr.)	1	%	109	94	106	107
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>						
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	0.1	< 0.1	< 0.1	< 0.1
<b>Ammonia (as N)</b>						
Ammonia (as N)	0.01	mg/L	0.72	3.2	1.7	0.01
<b>Biochemical Oxygen Demand (BOD-5 Day)</b>						
Biochemical Oxygen Demand (BOD-5 Day)	5	mg/L	< 5	< 5	< 5	< 5
<b>Conductivity (at 25 °C)</b>						
Conductivity (at 25 °C)	10	uS/cm	13000	7900	26000	780
<b>Nitrate &amp; Nitrite (as N)</b>						
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
<b>pH (at 25 °C)</b>						
pH (at 25 °C)	0.1	pH Units	6.6	6.8	7.0	7.6
<b>Phosphate total (as P)</b>						
Phosphate total (as P)	0.01	mg/L	< 0.01	< 0.01	0.40	0.10
<b>Total Kjeldahl Nitrogen (as N)</b>						
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	1.9	2.8	1.6	< 0.2
<b>Total Nitrogen (as N)*</b>						
Total Nitrogen (as N)*	0.2	mg/L	1.9	2.8	1.6	< 0.2
<b>Total Suspended Solids Dried at 103 °C to 105 °C</b>						
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	270	17	75	16
<b>Turbidity</b>						
Turbidity	1	NTU	1100	280	150	4.4
<b>Thermotolerant Coliforms</b>						
Thermotolerant Coliforms	1	CFU/100mL	< 1	< 1	< 1	< 1
<b>Heavy Metals</b>						
<b>Aluminium (filtered)</b>						
Aluminium (filtered)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
<b>Arsenic (filtered)</b>						
Arsenic (filtered)	0.001	mg/L	< 0.001	0.001	0.007	0.006
<b>Cadmium (filtered)</b>						
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
<b>Chromium (filtered)</b>						
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	0.003
<b>Copper (filtered)</b>						
Copper (filtered)	0.001	mg/L	0.002	0.015	0.002	0.004
<b>Iron (filtered)</b>						
Iron (filtered)	0.05	mg/L	75	16	11	0.61
<b>Lead (filtered)</b>						
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	0.004
<b>Mercury (filtered)</b>						
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
<b>Nickel (filtered)</b>						
Nickel (filtered)	0.001	mg/L	0.019	0.006	0.010	0.006
<b>Zinc (filtered)</b>						
Zinc (filtered)	0.005	mg/L	0.013	< 0.005	0.086	0.009

Client Sample ID			MW108R	MW109	MW301R	MW02
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N23- Ma0052128	N23- Ma0052129	N23- Ma0052130	N23- Ma0052131
Date Sampled			Mar 22, 2023	Mar 22, 2023	Mar 22, 2023	Mar 22, 2023
Test/Reference	LOR	Unit				
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1

Client Sample ID			MW108R	MW109	MW301R	MW02
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N23- Ma0052128	N23- Ma0052129	N23- Ma0052130	N23- Ma0052131
Date Sampled			Mar 22, 2023	Mar 22, 2023	Mar 22, 2023	Mar 22, 2023
Test/Reference	LOR	Unit				
<b>BTEX</b>						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	74	72	71	68
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>						
Naphthalene <sup>N02</sup>	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH >C10-C16 less Naphthalene (F2) <sup>N01</sup>	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C6-C10	0.02	mg/L	0.03	0.03	0.03	0.04
TRH C6-C10 less BTEX (F1) <sup>N04</sup>	0.02	mg/L	0.03	0.03	0.03	0.04
<b>Polycyclic Aromatic Hydrocarbons</b>						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene <sup>N07</sup>	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1,2,3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	<sup>Q09</sup> INT	51	<sup>Q09</sup> INT	<sup>Q09</sup> INT
p-Terphenyl-d14 (surr.)	1	%	99	87	100	112
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>						
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
<b>Water Quality Parameters</b>						
Ammonia (as N)	0.01	mg/L	0.18	0.52	4.0	1.7
Biochemical Oxygen Demand (BOD-5 Day)	5	mg/L	< 5	< 5	23	< 5
Conductivity (at 25 °C)	10	uS/cm	4200	5100	13000	2000
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
pH (at 25 °C)	0.1	pH Units	6.9	7.5	7.5	3.3
Phosphate total (as P)	0.01	mg/L	0.01	3.1	0.97	0.09
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	< 0.2	1.4	3.4	1.4
Total Nitrogen (as N)*	0.2	mg/L	< 0.2	1.4	3.4	1.4
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	< 5	190	36	130
Turbidity	1	NTU	40	200	84	150
Thermotolerant Coliforms	1	CFU/100mL	120	310	100	100

Client Sample ID			MW108R	MW109	MW301R	MW02
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N23- Ma0052128	N23- Ma0052129	N23- Ma0052130	N23- Ma0052131
Date Sampled			Mar 22, 2023	Mar 22, 2023	Mar 22, 2023	Mar 22, 2023
Test/Reference	LOR	Unit				
<b>Heavy Metals</b>						
Aluminium (filtered)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Arsenic (filtered)	0.001	mg/L	0.001	0.003	0.002	0.013
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001	0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001	0.002	< 0.001	0.002
Iron (filtered)	0.05	mg/L	4.9	0.59	7.5	56
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	0.008	0.001	0.003	0.056
Zinc (filtered)	0.005	mg/L	0.028	0.015	< 0.005	0.084

Client Sample ID			MW307R	MW308R	MW302R	FD01
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N23- Ma0052132	N23- Ma0052133	N23- Ma0052134	N23- Ma0052135
Date Sampled			Mar 22, 2023	Mar 22, 2023	Mar 22, 2023	Mar 22, 2023
Test/Reference	LOR	Unit				
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
<b>BTEX</b>						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	72	76	72	71
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>						
Naphthalene <sup>N02</sup>	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH >C10-C16 less Naphthalene (F2) <sup>N01</sup>	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C6-C10	0.02	mg/L	0.03	0.04	0.04	0.05
TRH C6-C10 less BTEX (F1) <sup>N04</sup>	0.02	mg/L	0.03	0.04	0.04	0.05
<b>Polycyclic Aromatic Hydrocarbons</b>						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene <sup>N07</sup>	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001

Client Sample ID			MW307R	MW308R	MW302R	FD01
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N23- Ma0052132	N23- Ma0052133	N23- Ma0052134	N23- Ma0052135
Date Sampled			Mar 22, 2023	Mar 22, 2023	Mar 22, 2023	Mar 22, 2023
Test/Reference	LOR	Unit				
<b>Polycyclic Aromatic Hydrocarbons</b>						
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	<sup>Q09</sup> INT	51	65	66
p-Terphenyl-d14 (surr.)	1	%	99	105	116	95
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>						
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
<b>Ammonia (as N)</b>						
Ammonia (as N)	0.01	mg/L	32	9.7	2.7	-
<b>Biochemical Oxygen Demand (BOD-5 Day)</b>						
Biochemical Oxygen Demand (BOD-5 Day)	5	mg/L	< 5	< 5	< 5	-
<b>Conductivity (at 25 °C)</b>						
Conductivity (at 25 °C)	10	uS/cm	33000	7300	2700	-
<b>Nitrate &amp; Nitrite (as N)</b>						
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.5	0.17	< 0.05	< 0.05
<b>pH (at 25 °C)</b>						
pH (at 25 °C)	0.1	pH Units	7.8	6.8	6.0	-
<b>Phosphate total (as P)</b>						
Phosphate total (as P)	0.01	mg/L	7.5	0.08	0.22	0.79
<b>Total Kjeldahl Nitrogen (as N)</b>						
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	21	11	2.2	1.5
<b>Total Nitrogen (as N)*</b>						
Total Nitrogen (as N)*	0.2	mg/L	21	11.17	2.2	1.5
<b>Total Suspended Solids Dried at 103 °C to 105 °C</b>						
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	18	100	150	-
<b>Turbidity</b>						
Turbidity	1	NTU	5.3	250	370	-
<b>Thermotolerant Coliforms</b>						
Thermotolerant Coliforms	1	CFU/100mL	2650	14700	900	-
<b>Heavy Metals</b>						
Aluminium (filtered)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Arsenic (filtered)	0.001	mg/L	0.002	0.008	0.002	0.002
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	0.002	< 0.001	< 0.001	< 0.001
Iron (filtered)	0.05	mg/L	0.39	52	57	57
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	< 0.001	0.016	0.007	0.007
Zinc (filtered)	0.005	mg/L	< 0.005	< 0.005	0.014	0.016

Client Sample ID			BASIN 1	RB01	RB02	BASIN 3
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N23- Ma0052136	N23- Ma0052137	N23- Ma0052138	N23- Ma0052139
Date Sampled			Mar 22, 2023	Mar 22, 2023	Mar 22, 2023	Mar 22, 2023
Test/Reference	LOR	Unit				
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>						
TRH C6-C9	0.02	mg/L	0.03	< 0.02	< 0.02	0.09
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	0.1	< 0.1	< 0.1	0.2
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	0.1	< 0.1	< 0.1	0.2
<b>BTEX</b>						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	73	76	76	84
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>						
Naphthalene <sup>N02</sup>	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH >C10-C16 less Naphthalene (F2) <sup>N01</sup>	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C6-C10	0.02	mg/L	0.06	0.03	0.04	0.12
TRH C6-C10 less BTEX (F1) <sup>N04</sup>	0.02	mg/L	0.06	0.03	0.04	0.12
<b>Polycyclic Aromatic Hydrocarbons</b>						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene <sup>N07</sup>	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1,2,3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	<sup>Q09</sup> INT	<sup>Q09</sup> INT	66	54
p-Terphenyl-d14 (surr.)	1	%	78	106	109	53
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>						
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	0.2	< 0.1	< 0.1	0.2
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	0.2	< 0.1	< 0.1	0.2
<b>Ammonia (as N)</b>						
Ammonia (as N)	0.01	mg/L	0.09	-	-	3.0
<b>Biochemical Oxygen Demand (BOD-5 Day)</b>						
Biochemical Oxygen Demand (BOD-5 Day)	5	mg/L	< 5	-	-	8.9
<b>Conductivity (at 25 °C)</b>						
Conductivity (at 25 °C)	10	uS/cm	1100	-	-	1800
<b>Nitrate &amp; Nitrite (as N)</b>						
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05	< 0.05	< 0.05	0.06



Client Sample ID			<b>BASIN 1</b>	<b>RB01</b>	<b>RB02</b>	<b>BASIN 3</b>
Sample Matrix			<b>Water</b>	<b>Water</b>	<b>Water</b>	<b>Water</b>
Eurofins Sample No.			<b>N23- Ma0052136</b>	<b>N23- Ma0052137</b>	<b>N23- Ma0052138</b>	<b>N23- Ma0052139</b>
Date Sampled			<b>Mar 22, 2023</b>	<b>Mar 22, 2023</b>	<b>Mar 22, 2023</b>	<b>Mar 22, 2023</b>
Test/Reference	LOR	Unit				
pH (at 25 °C)	0.1	pH Units	7.5	-	-	7.6
Phosphate total (as P)	0.01	mg/L	1.3	0.02	0.01	0.83
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	7.9	< 0.2	< 0.2	3.0
Total Nitrogen (as N)*	0.2	mg/L	7.9	< 0.2	< 0.2	3.06
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	220	-	-	33
Turbidity	1	NTU	86	-	-	11
Thermotolerant Coliforms	1	CFU/100mL	18450	-	-	910
<b>Heavy Metals</b>						
Aluminium	0.05	mg/L	0.40	< 0.05	< 0.05	1.9
Arsenic	0.001	mg/L	0.003	< 0.001	< 0.001	0.002
Cadmium	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium	0.001	mg/L	< 0.001	< 0.001	< 0.001	0.002
Copper	0.001	mg/L	0.002	< 0.001	< 0.001	< 0.001
Iron	0.05	mg/L	0.56	< 0.05	< 0.05	9.0
Lead	0.001	mg/L	0.002	< 0.001	< 0.001	0.001
Mercury	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel	0.001	mg/L	0.002	< 0.001	< 0.001	0.038
Zinc	0.005	mg/L	0.022	< 0.005	< 0.005	0.061

**Sample History**

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

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

Description	Testing Site	Extracted	Holding Time
<b>Eurofins Suite B4</b>			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Mar 28, 2023	7 Days
BTEX - Method: LTM-ORG-2010 BTEX and Volatile TRH	Sydney	Mar 28, 2023	14 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Mar 28, 2023	7 Days
Polycyclic Aromatic Hydrocarbons - Method: LTM-ORG-2130 PAH and Phenols in Soil and Water	Sydney	Mar 28, 2023	7 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Mar 28, 2023	7 Days
Ammonia (as N) - Method: APHA 4500-NH3 Ammonia Nitrogen by FIA	Melbourne	Mar 24, 2023	28 Days
Biochemical Oxygen Demand (BOD-5 Day) - Method: LTM-INO-4010 Biochemical Oxygen Demand (BOD5) in Water	Melbourne	Mar 24, 2023	2 Days
Conductivity (at 25 °C) - Method: LTM-INO-4030 Conductivity	Sydney	Mar 28, 2023	28 Days
pH (at 25 °C) - Method: LTM-GEN-7090 pH in water by ISE	Sydney	Mar 28, 2023	0 Hour
Total Suspended Solids Dried at 103 °C to 105 °C - Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry	Sydney	Mar 28, 2023	7 Days
Turbidity - Method: LTM-INO-4140 Turbidity by Nephelometric Method	Sydney	Mar 28, 2023	2 Days
Thermotolerant Coliforms - Method: AS 4276.5 (in-house method LTM-MIC-6010)	Newcastle	Mar 22, 2023	24 Hours
Heavy Metals - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Mar 28, 2023	28 Days
Heavy Metals (filtered) - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Mar 28, 2023	180 Days
Metals M8 - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Mar 28, 2023	28 Days
Metals M8 filtered - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Mar 28, 2023	28 Days
Total Nitrogen Set (as N)			
Nitrate & Nitrite (as N) - Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA	Melbourne	Mar 24, 2023	28 Days
Total Kjeldahl Nitrogen (as N) - Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA	Melbourne	Mar 24, 2023	28 Days
<b>Eurofins Suite B19A: Total N (TKN, NOx), Total P</b>			
Phosphate total (as P) - Method: E052 Total Phosphate (as P)	Sydney	Mar 28, 2023	28 Days

**Company Name:** GHD Pty Ltd NEWCASTLE  
**Address:** 3/24 Honeysuckle Dve  
Newcastle  
NSW 2300

**Project Name:** AURIZON HEXHAM WATER MONITORING  
**Project ID:** 12584780

**Order No.:**  
**Report #:** 974247  
**Phone:** 02 4979 9999  
**Fax:** 02 4979 9988

**Received:** Mar 22, 2023 1:55 PM  
**Due:** Mar 29, 2023  
**Priority:** 5 Day  
**Contact Name:** Leslie Maranciak

**Eurofins Analytical Services Manager : Andrew Black**

Sample Detail						Aluminium	Aluminium (filtered)	Ammonia (as N)	Biochemical Oxygen Demand (BOD-5 Day)	Conductivity (at 25 °C)	Iron	Iron (filtered)	pH (at 25 °C)	Thermotolerant Coliforms	Total Suspended Solids Dried at 103 °C to 105 °C	Turbidity	Metals M8	Metals M8 filtered	Eurofins Suite B4	Eurofins Suite B19A: Total N (TKN, NO <sub>x</sub> ), Total P
<b>Melbourne Laboratory - NATA # 1261 Site # 1254</b>								X	X									X	X	X
<b>Sydney Laboratory - NATA # 1261 Site # 18217</b>						X	X			X	X	X	X		X	X	X	X	X	X
<b>Mayfield Laboratory - NATA # 1261 Site # 25079 &amp; 25289</b>														X						
<b>External Laboratory</b>																				
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID															
1	MW01R	Mar 22, 2023		Water	N23-Ma0052124		X	X	X	X		X	X	X	X	X		X	X	X
2	101R	Mar 22, 2023		Water	N23-Ma0052125		X	X	X	X		X	X	X	X	X		X	X	X
3	MW101R	Mar 22, 2023		Water	N23-Ma0052126		X	X	X	X		X	X	X	X	X		X	X	X
4	MW106R	Mar 22, 2023		Water	N23-Ma0052127		X	X	X	X		X	X	X	X	X		X	X	X
5	MW108R	Mar 22, 2023		Water	N23-Ma0052128		X	X	X	X		X	X	X	X	X		X	X	X
6	MW109	Mar 22, 2023		Water	N23-Ma0052129		X	X	X	X		X	X	X	X	X		X	X	X
7	MW301R	Mar 22, 2023		Water	N23-Ma0052130		X	X	X	X		X	X	X	X	X		X	X	X
8	MW02	Mar 22, 2023		Water	N23-Ma0052131		X	X	X	X		X	X	X	X	X		X	X	X
9	MW307R	Mar 22, 2023		Water	N23-Ma0052132		X	X	X	X		X	X	X	X	X		X	X	X
10	MW308R	Mar 22, 2023		Water	N23-Ma0052133		X	X	X	X		X	X	X	X	X		X	X	X
11	MW302R	Mar 22, 2023		Water	N23-Ma0052134		X	X	X	X		X	X	X	X	X		X	X	X

<b>Company Name:</b>	GHD Pty Ltd NEWCASTLE	<b>Order No.:</b>		<b>Received:</b>	Mar 22, 2023 1:55 PM
<b>Address:</b>	3/24 Honeysuckle Dve Newcastle NSW 2300	<b>Report #:</b>	974247	<b>Due:</b>	Mar 29, 2023
<b>Project Name:</b>	AURIZON HEXHAM WATER MONITORING	<b>Phone:</b>	02 4979 9999	<b>Priority:</b>	5 Day
<b>Project ID:</b>	12584780	<b>Fax:</b>	02 4979 9988	<b>Contact Name:</b>	Leslie Maranciak

**Eurofins Analytical Services Manager : Andrew Black**

Sample Detail						Aluminium	Aluminium (filtered)	Ammonia (as N)	Biochemical Oxygen Demand (BOD-5 Day)	Conductivity (at 25 °C)	Iron	Iron (filtered)	pH (at 25 °C)	Thermotolerant Coliforms	Total Suspended Solids Dried at 103 °C to 105 °C	Turbidity	Metals M8	Metals M8 filtered	Eurofins Suite B4	Eurofins Suite B19A: Total N (TKN, NOx), Total P
<b>Melbourne Laboratory - NATA # 1261 Site # 1254</b>								X	X									X	X	X
<b>Sydney Laboratory - NATA # 1261 Site # 18217</b>						X	X			X	X	X	X		X	X	X	X	X	X
<b>Mayfield Laboratory - NATA # 1261 Site # 25079 &amp; 25289</b>														X						
12	FD01	Mar 22, 2023		Water	N23-Ma0052135		X					X						X	X	X
13	BASIN 1	Mar 22, 2023		Water	N23-Ma0052136	X		X	X	X	X	X	X	X	X	X	X	X	X	X
14	RB01	Mar 22, 2023		Water	N23-Ma0052137	X					X						X		X	X
15	RB02	Mar 22, 2023		Water	N23-Ma0052138	X					X						X		X	X
16	BASIN 3	Mar 22, 2023		Water	N23-Ma0052139	X		X	X	X	X	X	X	X	X	X	X	X	X	X
<b>Test Counts</b>						4	12	13	13	13	4	12	13	13	13	13	4	12	16	16

**Internal Quality Control Review and Glossary**
**General**

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

**Holding Times**

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

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

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

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

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

**Units**

**mg/kg:** milligrams per kilogram

**mg/L:** milligrams per litre

**µg/L:** micrograms per litre

**ppm:** parts per million

**ppb:** parts per billion

**%:** Percentage

**org/100 mL:** Organisms per 100 millilitres

**NTU:** Nephelometric Turbidity Units

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

**CFU:** Colony forming unit

**Terms**

<b>APHA</b>	American Public Health Association
<b>COC</b>	Chain of Custody
<b>CP</b>	Client Parent - QC was performed on samples pertaining to this report
<b>CRM</b>	Certified Reference Material (ISO17034) - reported as percent recovery.
<b>Dry</b>	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
<b>Duplicate</b>	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
<b>LOR</b>	Limit of Reporting.
<b>LCS</b>	Laboratory Control Sample - reported as percent recovery.
<b>Method Blank</b>	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
<b>NCP</b>	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
<b>RPD</b>	Relative Percent Difference between two Duplicate pieces of analysis.
<b>SPIKE</b>	Addition of the analyte to the sample and reported as percentage recovery.
<b>SRA</b>	Sample Receipt Advice
<b>Surr - Surrogate</b>	The addition of a like compound to the analyte target and reported as percentage recovery.
<b>TBTO</b>	Tributyltin oxide ( <i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
<b>TCLP</b>	Toxicity Characteristic Leaching Procedure
<b>TEQ</b>	Toxic Equivalency Quotient or Total Equivalence
<b>QSM</b>	US Department of Defense Quality Systems Manual Version 5.4
<b>US EPA</b>	United States Environmental Protection Agency
<b>WA DWER</b>	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

**QC - Acceptance Criteria**

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

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

Results <10 times the LOR: No Limit

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

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

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

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

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

**QC Data General Comments**

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

**Quality Control Results**

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Method Blank</b>							
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>							
TRH C6-C9	mg/L	0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
<b>Method Blank</b>							
<b>BTEX</b>							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total*	mg/L	< 0.003			0.003	Pass	
<b>Method Blank</b>							
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>							
Naphthalene	mg/L	< 0.01			0.01	Pass	
TRH C6-C10	mg/L	0.06			0.02	Fail	
<b>Method Blank</b>							
<b>Polycyclic Aromatic Hydrocarbons</b>							
Acenaphthene	mg/L	< 0.001			0.001	Pass	
Acenaphthylene	mg/L	< 0.001			0.001	Pass	
Anthracene	mg/L	< 0.001			0.001	Pass	
Benz(a)anthracene	mg/L	< 0.001			0.001	Pass	
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.001			0.001	Pass	
Benzo(g,h,i)perylene	mg/L	< 0.001			0.001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.001			0.001	Pass	
Chrysene	mg/L	< 0.001			0.001	Pass	
Dibenz(a,h)anthracene	mg/L	< 0.001			0.001	Pass	
Fluoranthene	mg/L	< 0.001			0.001	Pass	
Fluorene	mg/L	< 0.001			0.001	Pass	
Indeno(1,2,3-cd)pyrene	mg/L	< 0.001			0.001	Pass	
Naphthalene	mg/L	< 0.001			0.001	Pass	
Phenanthrene	mg/L	< 0.001			0.001	Pass	
Pyrene	mg/L	< 0.001			0.001	Pass	
<b>Method Blank</b>							
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>							
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
<b>Method Blank</b>							
Ammonia (as N)	mg/L	< 0.01			0.01	Pass	
Biochemical Oxygen Demand (BOD-5 Day)	mg/L	< 5			5	Pass	
Conductivity (at 25 °C)	uS/cm	< 10			10	Pass	
Nitrate & Nitrite (as N)	mg/L	< 0.05			0.05	Pass	
Phosphate total (as P)	mg/L	< 0.01			0.01	Pass	
Total Kjeldahl Nitrogen (as N)	mg/L	< 0.2			0.2	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	mg/L	< 5			5	Pass	
Turbidity	NTU	< 1			1	Pass	
<b>Method Blank</b>							
<b>Heavy Metals</b>							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Aluminium	mg/L	< 0.05			0.05	Pass	
Aluminium (filtered)	mg/L	< 0.05			0.05	Pass	
Arsenic	mg/L	< 0.001			0.001	Pass	
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Cadmium (filtered)	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Iron	mg/L	< 0.05			0.05	Pass	
Iron (filtered)	mg/L	< 0.05			0.05	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
<b>LCS - % Recovery</b>							
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>							
TRH C6-C9	%	105			70-130	Pass	
TRH C10-C14	%	91			70-130	Pass	
<b>LCS - % Recovery</b>							
<b>BTEX</b>							
Benzene	%	101			70-130	Pass	
Toluene	%	94			70-130	Pass	
Ethylbenzene	%	103			70-130	Pass	
m&p-Xylenes	%	121			70-130	Pass	
o-Xylene	%	122			70-130	Pass	
Xylenes - Total*	%	121			70-130	Pass	
<b>LCS - % Recovery</b>							
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>							
Naphthalene	%	75			70-130	Pass	
TRH C6-C10	%	112			70-130	Pass	
<b>LCS - % Recovery</b>							
<b>Polycyclic Aromatic Hydrocarbons</b>							
Acenaphthene	%	94			70-130	Pass	
Acenaphthylene	%	96			70-130	Pass	
Anthracene	%	89			70-130	Pass	
Benz(a)anthracene	%	88			70-130	Pass	
Benzo(a)pyrene	%	100			70-130	Pass	
Benzo(b&j)fluoranthene	%	99			70-130	Pass	
Benzo(g,h,i)perylene	%	101			70-130	Pass	
Benzo(k)fluoranthene	%	92			70-130	Pass	
Chrysene	%	98			70-130	Pass	
Dibenz(a,h)anthracene	%	96			70-130	Pass	
Fluoranthene	%	89			70-130	Pass	
Fluorene	%	94			70-130	Pass	
Indeno(1,2,3-cd)pyrene	%	95			70-130	Pass	
Naphthalene	%	95			70-130	Pass	
Phenanthrene	%	95			70-130	Pass	
Pyrene	%	91			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code	
<b>LCS - % Recovery</b>								
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>								
TRH >C10-C16	%	93			70-130	Pass		
<b>LCS - % Recovery</b>								
Ammonia (as N)	%	101			70-130	Pass		
Biochemical Oxygen Demand (BOD-5 Day)	%	115			85-115	Pass		
Conductivity (at 25 °C)	%	103			70-130	Pass		
Nitrate & Nitrite (as N)	%	106			70-130	Pass		
Phosphate total (as P)	%	90			70-130	Pass		
Total Kjeldahl Nitrogen (as N)	%	90			70-130	Pass		
Total Suspended Solids Dried at 103 °C to 105 °C	%	109			70-130	Pass		
Turbidity	%	85			70-130	Pass		
<b>LCS - % Recovery</b>								
<b>Heavy Metals</b>								
Aluminium	%	92			80-120	Pass		
Aluminium (filtered)	%	88			80-120	Pass		
Arsenic	%	96			80-120	Pass		
Arsenic (filtered)	%	97			80-120	Pass		
Cadmium	%	95			80-120	Pass		
Cadmium (filtered)	%	109			80-120	Pass		
Chromium	%	96			80-120	Pass		
Chromium (filtered)	%	105			80-120	Pass		
Copper	%	90			80-120	Pass		
Copper (filtered)	%	101			80-120	Pass		
Iron	%	92			80-120	Pass		
Iron (filtered)	%	90			80-120	Pass		
Lead	%	94			80-120	Pass		
Lead (filtered)	%	102			80-120	Pass		
Mercury	%	109			80-120	Pass		
Mercury (filtered)	%	104			80-120	Pass		
Nickel	%	93			80-120	Pass		
Nickel (filtered)	%	102			80-120	Pass		
Zinc	%	88			80-120	Pass		
Zinc (filtered)	%	105			80-120	Pass		
Test	Lab Sample ID	QA Source	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
<b>Spike - % Recovery</b>								
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>				Result 1				
TRH C6-C9	N23-Ma0057787	NCP	%	86		70-130	Pass	
TRH C10-C14	S23-Ma0053872	NCP	%	102		70-130	Pass	
<b>Spike - % Recovery</b>								
<b>BTEX</b>				Result 1				
Benzene	N23-Ma0057787	NCP	%	112		70-130	Pass	
Toluene	N23-Ma0057787	NCP	%	100		70-130	Pass	
Ethylbenzene	N23-Ma0057787	NCP	%	101		70-130	Pass	
m&p-Xylenes	N23-Ma0057787	NCP	%	113		70-130	Pass	
o-Xylene	N23-Ma0057787	NCP	%	124		70-130	Pass	
Xylenes - Total*	N23-Ma0057787	NCP	%	117		70-130	Pass	
<b>Spike - % Recovery</b>								
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>				Result 1				
Naphthalene	N23-Ma0057787	NCP	%	76		70-130	Pass	
TRH C6-C10	N23-Ma0057787	NCP	%	87		70-130	Pass	
<b>Spike - % Recovery</b>								
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>				Result 1				
TRH >C10-C16	S23-Ma0053872	NCP	%	96		70-130	Pass	



Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Spike - % Recovery</b>									
				Result 1					
Ammonia (as N)	Z23-Ma0031418	NCP	%	92			70-130	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	S23-Ma0055842	NCP	%	98			70-130	Pass	
<b>Spike - % Recovery</b>									
<b>Heavy Metals</b>									
				Result 1					
Aluminium (filtered)	S23-Ma0057435	NCP	%	91			75-125	Pass	
Arsenic (filtered)	S23-Ma0057435	NCP	%	101			75-125	Pass	
Cadmium (filtered)	S23-Ma0057435	NCP	%	99			75-125	Pass	
Chromium (filtered)	S23-Ma0057435	NCP	%	96			75-125	Pass	
Copper (filtered)	S23-Ma0057435	NCP	%	90			75-125	Pass	
Lead (filtered)	S23-Ma0057435	NCP	%	96			75-125	Pass	
Mercury (filtered)	S23-Ma0057435	NCP	%	92			75-125	Pass	
Nickel (filtered)	S23-Ma0054763	NCP	%	90			75-125	Pass	
Zinc (filtered)	S23-Ma0054763	NCP	%	87			75-125	Pass	
<b>Spike - % Recovery</b>									
				Result 1					
Phosphate total (as P)	N23-Ma0052125	CP	%	84			70-130	Pass	
<b>Spike - % Recovery</b>									
<b>Polycyclic Aromatic Hydrocarbons</b>									
				Result 1					
Acenaphthene	N23-Ma0052132	CP	%	86			70-130	Pass	
Acenaphthylene	N23-Ma0052132	CP	%	90			70-130	Pass	
Anthracene	N23-Ma0052132	CP	%	77			70-130	Pass	
Fluoranthene	N23-Ma0052132	CP	%	70			70-130	Pass	
Fluorene	N23-Ma0052132	CP	%	86			70-130	Pass	
Naphthalene	N23-Ma0052132	CP	%	80			70-130	Pass	
Phenanthrene	N23-Ma0052132	CP	%	84			70-130	Pass	
Pyrene	N23-Ma0052132	CP	%	71			70-130	Pass	
<b>Spike - % Recovery</b>									
				Result 1					
Nitrate & Nitrite (as N)	N23-Ma0052132	CP	%	78			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	N23-Ma0052132	CP	%	88			70-130	Pass	
<b>Spike - % Recovery</b>									
<b>Heavy Metals</b>									
				Result 1					
Aluminium	S23-Ma0061576	NCP	%	95			75-125	Pass	
Arsenic	S23-Ma0061576	NCP	%	98			75-125	Pass	
Cadmium	S23-Ma0061576	NCP	%	97			75-125	Pass	
Chromium	S23-Ma0061576	NCP	%	93			75-125	Pass	
Copper	S23-Ma0061576	NCP	%	87			75-125	Pass	
Iron	S23-Ma0061576	NCP	%	88			75-125	Pass	
Lead	S23-Ma0061576	NCP	%	91			75-125	Pass	
Mercury	S23-Ma0061576	NCP	%	108			75-125	Pass	
Nickel	S23-Ma0061576	NCP	%	90			75-125	Pass	
Zinc	S23-Ma0061576	NCP	%	85			75-125	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Duplicate</b>									
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>									
				Result 1	Result 2	RPD			
TRH C6-C9	S23-Ma0054763	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C10-C14	N23-Ma0062354	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	N23-Ma0062354	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	N23-Ma0062354	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
<b>Duplicate</b>									
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>									
				Result 1	Result 2	RPD			
TRH C6-C10	S23-Ma0054763	NCP	mg/L	0.02	< 0.02	8.1	30%	Pass	

Duplicate								
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD		
TRH >C10-C16	N23-Ma0062354	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass
TRH >C16-C34	N23-Ma0062354	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass
TRH >C34-C40	N23-Ma0062354	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Ammonia (as N)	M23-Ma0057890	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass
Nitrate & Nitrite (as N)	M23-Ma0057890	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass
Phosphate total (as P)	N23-Ma0052124	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Aluminium (filtered)	N23-Ma0052124	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass
Arsenic (filtered)	N23-Ma0052124	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Cadmium (filtered)	N23-Ma0052124	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Chromium (filtered)	N23-Ma0052124	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Copper (filtered)	N23-Ma0052124	CP	mg/L	0.002	0.002	1.7	30%	Pass
Iron (filtered)	N23-Ma0052124	CP	mg/L	75	76	1.3	30%	Pass
Lead (filtered)	N23-Ma0052124	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Mercury (filtered)	N23-Ma0052124	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Nickel (filtered)	N23-Ma0052124	CP	mg/L	0.019	0.019	2.5	30%	Pass
Zinc (filtered)	N23-Ma0052124	CP	mg/L	0.013	0.013	2.9	30%	Pass
Duplicate								
BTEX				Result 1	Result 2	RPD		
Benzene	N23-Ma0052125	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Toluene	N23-Ma0052125	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Ethylbenzene	N23-Ma0052125	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
m&p-Xylenes	N23-Ma0052125	CP	mg/L	< 0.002	< 0.002	<1	30%	Pass
o-Xylene	N23-Ma0052125	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Xylenes - Total*	N23-Ma0052125	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass
Duplicate								
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD		
Naphthalene	N23-Ma0052125	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Conductivity (at 25 °C)	N23-Ma0052125	CP	uS/cm	7900	7900	1.1	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Aluminium (filtered)	N23-Ma0052125	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass
Arsenic (filtered)	N23-Ma0052125	CP	mg/L	0.001	0.001	24	30%	Pass
Cadmium (filtered)	N23-Ma0052125	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Chromium (filtered)	N23-Ma0052125	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Copper (filtered)	N23-Ma0052125	CP	mg/L	0.015	0.014	8.5	30%	Pass
Iron (filtered)	N23-Ma0052125	CP	mg/L	16	15	4.4	30%	Pass
Lead (filtered)	N23-Ma0052125	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Mercury (filtered)	N23-Ma0052125	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Nickel (filtered)	N23-Ma0052125	CP	mg/L	0.006	0.005	11	30%	Pass
Zinc (filtered)	N23-Ma0052125	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Biochemical Oxygen Demand (BOD-5 Day)	N23-Ma0052128	CP	mg/L	< 5	< 5	<1	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Turbidity	N23-Ma0052129	CP	NTU	200	210	2.5	30%	Pass

Duplicate								
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD		
Acenaphthene	N23-Ma0052131	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Acenaphthylene	N23-Ma0052131	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Anthracene	N23-Ma0052131	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benzo(a)anthracene	N23-Ma0052131	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benzo(a)pyrene	N23-Ma0052131	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benzo(b&j)fluoranthene	N23-Ma0052131	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benzo(g,h,i)perylene	N23-Ma0052131	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benzo(k)fluoranthene	N23-Ma0052131	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Chrysene	N23-Ma0052131	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Dibenz(a,h)anthracene	N23-Ma0052131	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Fluoranthene	N23-Ma0052131	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Fluorene	N23-Ma0052131	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Indeno(1,2,3-cd)pyrene	N23-Ma0052131	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Naphthalene	N23-Ma0052131	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Phenanthrene	N23-Ma0052131	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Pyrene	N23-Ma0052131	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Total Kjeldahl Nitrogen (as N)	N23-Ma0052133	CP	mg/L	11	11	2.8	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Conductivity (at 25 °C)	N23-Ma0052134	CP	uS/cm	2700	2600	2.6	30%	Pass
Total Suspended Solids Dried at 103 °C to 105 °C	N23-Ma0052134	CP	mg/L	150	150	2.7	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Phosphate total (as P)	N23-Ma0052136	CP	mg/L	1.3	1.3	3.9	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Aluminium	N23-Ma0052136	CP	mg/L	0.40	0.38	5.8	30%	Pass
Arsenic	N23-Ma0052136	CP	mg/L	0.003	0.003	19	30%	Pass
Cadmium	N23-Ma0052136	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Chromium	N23-Ma0052136	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Copper	N23-Ma0052136	CP	mg/L	0.002	< 0.001	59	30%	Fail
Iron	N23-Ma0052136	CP	mg/L	0.56	0.50	11	30%	Pass
Lead	N23-Ma0052136	CP	mg/L	0.002	0.001	45	30%	Fail
Nickel	N23-Ma0052136	CP	mg/L	0.002	0.001	13	30%	Pass
Zinc	N23-Ma0052136	CP	mg/L	0.022	0.019	12	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Aluminium	N23-Ma0052137	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass
Arsenic	N23-Ma0052137	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Cadmium	N23-Ma0052137	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Copper	N23-Ma0052137	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Iron	N23-Ma0052137	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass
Lead	N23-Ma0052137	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Mercury	N23-Ma0052137	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Zinc	N23-Ma0052137	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Aluminium	N23-Ma0052138	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass
Arsenic	N23-Ma0052138	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Chromium	N23-Ma0052138	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Copper	N23-Ma0052138	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass

Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Iron	N23-Ma0052138	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass
Lead	N23-Ma0052138	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Mercury	N23-Ma0052138	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Nickel	N23-Ma0052138	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Zinc	N23-Ma0052138	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass

**Comments**
**Sample Integrity**

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

**Qualifier Codes/Comments**

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q09	The Surrogate recovery is outside of the recommended acceptance criteria due to matrix interference. Acceptance criteria were met for all other QC

**Authorised by:**

Andrew Black	Analytical Services Manager
Fang Yee Tan	Senior Analyst-Metal
Maria Tian	Senior Analyst-Organic
Mary Makarios	Senior Analyst-Inorganic
Mickael Ros	Senior Analyst-Metal
Raymond Siu	Senior Analyst-Volatile
Roopesh Rangarajan	Senior Analyst-Organic
Ryan Phillips	Senior Analyst-Inorganic



**Glenn Jackson**  
**General Manager**

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

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

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Perth
46-48 Banksia Road Welshpool WA 6106 Tel: +61 8 6253 4444 NATA# 2377 Site# 2370

**Eurofins Environment Testing NZ Ltd**

NZBN: 9429046024954

Auckland	Christchurch
35 O'Rorke Road Penrose, Auckland 1061 Tel: +64 9 526 45 51 IANZ# 1327	43 Detroit Drive Rolleston, Christchurch 7675 Tel: 0800 856 450 IANZ# 1290

## Sample Receipt Advice

<b>Company name:</b>	GHD Pty Ltd NEWCASTLE
<b>Contact name:</b>	Leslie Maranciak
<b>Project name:</b>	AURIZON HEXHAM WATER MONITORING
<b>Project ID:</b>	12584780
<b>Turnaround time:</b>	5 Day
<b>Date/Time received</b>	Mar 22, 2023 1:55 PM
<b>Eurofins reference</b>	974247

## Sample Information

- ✓ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ✓ Sample Temperature of chilled sample on the batch as recorded by Eurofins Sample Receipt : 13.3 degrees Celsius.
- ✓ All samples have been received as described on the above COC.
- ✓ COC has been completed correctly.
- ✓ Attempt to chill was evident.
- ✓ Appropriately preserved sample containers have been used.
- ✓ All samples were received in good condition.
- ✓ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ✓ Appropriate sample containers have been used.
- ✓ Sample containers for volatile analysis received with zero headspace.
- ✗ Split sample sent to requested external lab.
- ✗ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

## Notes

## Contact

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

**Andrew Black on phone : (+61) 2 9900 8490 or by email: AndrewBlack@eurofins.com**

Results will be delivered electronically via email to Leslie Maranciak - leslie.maranciak@ghd.com.

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



mgt

Sydney

Unit F3 - 6 Building F, 16 Mars Road, Lane Cove  
Phone: +612 9500 8400  
Email: enviro\_syd@mglabmark.com.au

Brisbane

Unit 1-21 Smallwood Place, Murrumbidgee  
Phone: +617 3902 4600  
Email: enviro\_bris@mglabmark.com.au

Melbourne

2 Kingston Town Close, Oakleigh, VIC 3166  
Phone: +613 8564 5000 Fax: +613 8564 5090  
Email: enviro\_melb@mglabmark.com.au

## CHAIN OF CUSTODY RECORD

**CLIENT DETAILS**

Page 1 of 1

Company Name: <b>GHD</b>	Contact Name: <b>Lachlan Parkinson</b>	Purchase Order: <b>12584780</b>	COC Number:
Office Address: <b>L3, 24 Honeysuckle Drive Newcastle 2300</b>	Project Manager: <b>Leslie Maranciak</b>	PROJECT Number: <b>12584780</b>	Eurofins   mgt quote ID: <b>180501GHD</b>
	Email for results: <b>Leslie.Maranciak@ghd.com Lachlan.Parkinson@ghd.com</b>	PROJECT Name: <b>Aurizon Hexham Water Monitoring</b>	Data output format: <b>ESDAT</b>

**Special Directions & Comments:**

**Please ensure fecal coliforms are reported in CFU/100ml**

Eurofins | mgt DI water batch number:

Sample ID	Date	Matrix	Analytes													Some common holding times (with correct preservation) For further information contact the lab				Sample comments:							
			B4 (BTEXN / TRH / PAH) Dissolved Metals (Al, As, Cd, Cr, Cu, Fe, Pb, Hg, Ni, Zn)	pH	Conductivity	Turbidity	Suspended Solids	Ammonia	Sulfate B18A (Nitrate, Total N (TKN), NO3), Total P	Thermotolerant Coliforms (CFU/100ml)	BOD 5 Day	Send to ALS - same analysis as F001 at ALS please	Waters		Soils												
1	22/3/23	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
2		W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
3		W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
4		W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
5		W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
6		W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
7		W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
8		W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
9		W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
10		W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
11		W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
12		W	X	X																							
13		W																									Send to ALS for Same Analysis as F001
14	Basin 1	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
15	RO01	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
16	RO02	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
17	Basin 3	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		

Relinquished By: <i>L Parkinson</i>	Received By: <i>Jaidra Stouss</i>	Turn around time	Method Of Shipment	Temperature on arrival: <b>13.3</b>
Date & Time: <b>22/3/23</b>	Date & Time: <b>22/3/23 1:55 PM</b>	1 DAY <input type="checkbox"/> 2 DAY <input type="checkbox"/> 3 DAY <input type="checkbox"/>	<input type="checkbox"/> Courier <input type="checkbox"/> Hand Delivered <input type="checkbox"/> Postal	Report number: <b>974247</b>
Signature: <i>[Signature]</i>	Signature: <i>[Signature]</i>	4 DAY <input checked="" type="checkbox"/> 10 DAY <input type="checkbox"/> Other	Courier Consignment #:	



## CERTIFICATE OF ANALYSIS

Work Order	: <b>ES2310057</b>	Page	: 1 of 6
Client	: <b>GHD PTY LTD</b>	Laboratory	: Environmental Division Sydney
Contact	: Leslie Maranciak	Contact	: Sarah Mathew
Address	: Level 3, GHD Tower, 24 Honeysuckle Drive Newcastle 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: 12584780	Date Samples Received	: 27-Mar-2023 17:25
Order number	: 12584780	Date Analysis Commenced	: 29-Mar-2023
C-O-C number	: ----	Issue Date	: 03-Apr-2023 15:43
Sampler	: ----		
Site	:		
Quote number	: EN/005		
No. of samples received	: 1		
No. of samples analysed	: 1		



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
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.

- 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)				Sample ID	FD02	----	----	----	----
Sampling date / time				22-Mar-2023 00:00	----	----	----	----	
Compound	CAS Number	LOR	Unit	ES2310057-001	-----	-----	-----	-----	
				Result	---	---	---	---	
<b>EG020F: Dissolved Metals by ICP-MS</b>									
Arsenic	7440-38-2	0.001	mg/L	0.003	----	----	----	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	----	----	----	----	
Chromium	7440-47-3	0.001	mg/L	<0.001	----	----	----	----	
Copper	7440-50-8	0.001	mg/L	<0.001	----	----	----	----	
Lead	7439-92-1	0.001	mg/L	<0.001	----	----	----	----	
Nickel	7440-02-0	0.001	mg/L	0.008	----	----	----	----	
Zinc	7440-66-6	0.005	mg/L	0.017	----	----	----	----	
<b>EG035F: Dissolved Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----	
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>									
Nitrite + Nitrate as N	----	0.01	mg/L	0.02	----	----	----	----	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	3.4	----	----	----	----	
<b>EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser</b>									
^ Total Nitrogen as N	----	0.1	mg/L	3.4	----	----	----	----	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L	1.10	----	----	----	----	
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons</b>									
Naphthalene	91-20-3	1.0	µg/L	<1.0	----	----	----	----	
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	----	----	----	----	
Acenaphthene	83-32-9	1.0	µg/L	<1.0	----	----	----	----	
Fluorene	86-73-7	1.0	µg/L	<1.0	----	----	----	----	
Phenanthrene	85-01-8	1.0	µg/L	<1.0	----	----	----	----	
Anthracene	120-12-7	1.0	µg/L	<1.0	----	----	----	----	
Fluoranthene	206-44-0	1.0	µg/L	<1.0	----	----	----	----	
Pyrene	129-00-0	1.0	µg/L	<1.0	----	----	----	----	
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	----	----	----	----	
Chrysene	218-01-9	1.0	µg/L	<1.0	----	----	----	----	
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L	<1.0	----	----	----	----	
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	----	----	----	----	
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	----	----	----	----	
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	----	----	----	----	
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L	<1.0	----	----	----	----	
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L	<1.0	----	----	----	----	



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	FD02	----	----	----	----
Sampling date / time				22-Mar-2023 00:00	----	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2310057-001	-----	-----	-----	-----	-----
				Result	---	---	---	---	---
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued</b>									
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	----	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	----	----	----	----	----
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----	----
C10 - C14 Fraction	----	50	µg/L	<50	----	----	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	----	----	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	----	----	----	----	----
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----	----
>C10 - C16 Fraction	----	100	µg/L	<100	----	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	----	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	----	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	----	----	----	----	----
<b>EP080: BTEXN</b>									
Benzene	71-43-2	1	µg/L	<1	----	----	----	----	----
Toluene	108-88-3	2	µg/L	<2	----	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----	----
^ Total Xylenes	----	2	µg/L	<2	----	----	----	----	----
^ Sum of BTEX	----	1	µg/L	<1	----	----	----	----	----
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----	----
<b>EP075(SIM)S: Phenolic Compound Surrogates</b>									
Phenol-d6	13127-88-3	1.0	%	29.3	----	----	----	----	----
2-Chlorophenol-D4	93951-73-6	1.0	%	53.9	----	----	----	----	----
2,4,6-Tribromophenol	118-79-6	1.0	%	65.5	----	----	----	----	----
<b>EP075(SIM)T: PAH Surrogates</b>									
2-Fluorobiphenyl	321-60-8	1.0	%	61.8	----	----	----	----	----
Anthracene-d10	1719-06-8	1.0	%	69.9	----	----	----	----	----



### Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	FD02	----	----	----	----
Sampling date / time				22-Mar-2023 00:00	----	----	----	----	
Compound	CAS Number	LOR	Unit	ES2310057-001	-----	-----	-----	-----	
				Result	---	---	---	---	
<b>EP075(SIM)T: PAH Surrogates - Continued</b>									
4-Terphenyl-d14	1718-51-0	1.0	%	76.1	----	----	----	----	
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	2	%	92.2	----	----	----	----	
Toluene-D8	2037-26-5	2	%	94.9	----	----	----	----	
4-Bromofluorobenzene	460-00-4	2	%	96.9	----	----	----	----	



## Surrogate Control Limits

Sub-Matrix: WATER		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	72	143
Toluene-D8	2037-26-5	75	131
4-Bromofluorobenzene	460-00-4	73	137



## QUALITY CONTROL REPORT

Work Order	: <b>ES2310057</b>	Page	: 1 of 6
Client	: <b>GHD PTY LTD</b>	Laboratory	: Environmental Division Sydney
Contact	: Leslie Maranciak	Contact	: Sarah Mathew
Address	: Level 3, GHD Tower, 24 Honeysuckle Drive Newcastle 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: 12584780	Date Samples Received	: 27-Mar-2023
Order number	: 12584780	Date Analysis Commenced	: 29-Mar-2023
C-O-C number	: ----	Issue Date	: 03-Apr-2023
Sampler	: ----		
Site	:		
Quote number	: EN/005		
No. of samples received	: 1		
No. of samples analysed	: 1		



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
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
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: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
<b>EG020F: Dissolved Metals by ICP-MS (QC Lot: 4962123)</b>									
ES2310386-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
ES2309648-002	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	0.0077	0.0077	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.270	0.281	3.9	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.079	0.084	5.3	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.490	0.477	2.8	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.238	0.257	7.8	No Limit
<b>EG035F: Dissolved Mercury by FIMS (QC Lot: 4962127)</b>									
ES2310187-001	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2310471-001	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 4959218)</b>									
ES2310000-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	1.81	1.80	0.0	0% - 20%
ES2310048-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.45	0.45	0.0	0% - 20%
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 4959214)</b>									
ES2309474-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<5.0	<5.0	0.0	No Limit
ES2310048-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	38.6	38.2	0.8	0% - 20%



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
<b>EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 4959215)</b>									
ES2309474-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.50	1.36	92.5	No Limit
ES2310048-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	1.08	1.08	0.0	0% - 50%
<b>EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4963080)</b>									
EM2305318-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES2310058-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4963080)</b>									
EM2305318-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES2310058-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
<b>EP080: BTEXN (QC Lot: 4963080)</b>									
EM2305318-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
ES2310058-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit





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

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

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
				Result	Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low	High
<b>EG020F: Dissolved Metals by ICP-MS (QCLot: 4962123)</b>								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	93.5	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	93.6	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	94.0	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	87.2	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	101	83.0	111
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	87.0	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	90.0	81.0	117
<b>EG035F: Dissolved Mercury by FIMS (QCLot: 4962127)</b>								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	83.9	83.0	105
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 4959218)</b>								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	104	91.0	113
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4959214)</b>								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	82.9	69.0	101
				<0.1	1 mg/L	90.8	70.0	118
				<0.1	5 mg/L	88.4	70.0	130
<b>EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 4959215)</b>								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	88.9	71.3	126
				<0.01	0.442 mg/L	95.0	71.3	126
				<0.01	1 mg/L	99.1	71.3	126
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4956992)</b>								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	66.3	50.0	94.0
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	73.4	63.6	114
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	66.6	62.2	113
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	66.8	63.9	115
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	76.9	62.6	116
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	83.4	64.3	116
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	81.9	63.6	118
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	83.3	63.1	118
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	66.5	64.1	117
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	68.5	62.5	116



Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	Low	High
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4956992) - continued</b>								
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	5 µg/L	73.3	61.7	119
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	66.8	63.0	115
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	75.1	63.3	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	72.0	59.9	118
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	72.1	61.2	117
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	70.0	59.1	118
<b>EP080/071: Total Petroleum Hydrocarbons (QCLot: 4956993)</b>								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	76.8	53.7	97.0
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	90.5	63.3	107
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	98.7	58.3	120
<b>EP080/071: Total Petroleum Hydrocarbons (QCLot: 4963080)</b>								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	83.3	75.0	127
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4956993)</b>								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	69.7	53.9	95.5
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	75.9	57.8	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	74.0	50.5	115
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4963080)</b>								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	84.2	75.0	127
<b>EP080: BTEXN (QCLot: 4963080)</b>								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	110	68.3	119
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	99.7	73.5	120
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	106	73.8	122
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	107	73.0	122
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	113	76.4	123
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	96.8	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: **WATER**

				Matrix Spike (MS) Report		
				Spike Concentration	Spike Recovery(%) MS	Acceptable Limits (%)
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Low	High	



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
<b>EG020F: Dissolved Metals by ICP-MS (QCLot: 4962123)</b>							
ES2309648-003	Anonymous	EG020A-F: Arsenic	7440-38-2	2 mg/L	79.6	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.5 mg/L	77.4	70.0	130
		EG020A-F: Chromium	7440-47-3	2 mg/L	77.4	70.0	130
		EG020A-F: Copper	7440-50-8	2 mg/L	75.9	70.0	130
		EG020A-F: Lead	7439-92-1	2 mg/L	73.7	70.0	130
		EG020A-F: Nickel	7440-02-0	2 mg/L	75.9	70.0	130
		EG020A-F: Zinc	7440-66-6	2 mg/L	76.2	70.0	130
<b>EG035F: Dissolved Mercury by FIMS (QCLot: 4962127)</b>							
ES2310057-001	FD02	EG035F: Mercury	7439-97-6	0.01 mg/L	74.3	70.0	130
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 4959218)</b>							
ES2310000-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	97.5	70.0	130
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4959214)</b>							
ES2310000-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	10 mg/L	97.0	70.0	130
<b>EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 4959215)</b>							
ES2310000-001	Anonymous	EK067G: Total Phosphorus as P	----	2 mg/L	95.5	70.0	130
<b>EP080/071: Total Petroleum Hydrocarbons (QCLot: 4963080)</b>							
EM2305318-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	94.2	70.0	130
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4963080)</b>							
EM2305318-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	94.4	70.0	130
<b>EP080: BTEXN (QCLot: 4963080)</b>							
EM2305318-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	80.2	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	81.6	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	86.6	70.0	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	85.8	70.0	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	87.4	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	88.0	70.0	130



## QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES2310057	Page	: 1 of 6
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: Leslie Maranciak	Telephone	: +61-2-8784 8555
Project	: 12584780	Date Samples Received	: 27-Mar-2023
Site	:	Issue Date	: 03-Apr-2023
Sampler	: ----	No. of samples received	: 1
Order number	: 12584780	No. of samples analysed	: 1

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

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

### Summary of Outliers

#### Outliers : Quality Control Samples

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

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

#### Outliers : Analysis Holding Time Compliance

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

#### Outliers : Frequency of Quality Control Samples

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



### Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
	0				
<b>Laboratory Duplicates (DUP)</b>					
PAH/Phenols (GC/MS - SIM)	0	3	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	11	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
<b>Matrix Spikes (MS)</b>					
PAH/Phenols (GC/MS - SIM)	0	3	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	11	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

### Analysis Holding Time Compliance

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

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

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

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

Matrix: **WATER**

Evaluation: \* = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
<b>EG020F: Dissolved Metals by ICP-MS</b>							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F) FD02	22-Mar-2023	----	----	----	30-Mar-2023	18-Sep-2023	✓
<b>EG035F: Dissolved Mercury by FIMS</b>							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F) FD02	22-Mar-2023	----	----	----	31-Mar-2023	19-Apr-2023	✓
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>							
Clear Plastic Bottle - Sulfuric Acid (EK059G) FD02	22-Mar-2023	----	----	----	31-Mar-2023	19-Apr-2023	✓
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>							
Clear Plastic Bottle - Sulfuric Acid (EK061G) FD02	22-Mar-2023	29-Mar-2023	19-Apr-2023	✓	30-Mar-2023	19-Apr-2023	✓
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>							
Clear Plastic Bottle - Sulfuric Acid (EK067G) FD02	22-Mar-2023	29-Mar-2023	19-Apr-2023	✓	30-Mar-2023	19-Apr-2023	✓
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons</b>							
Amber Glass Bottle - Unpreserved (EP075(SIM)) FD02	22-Mar-2023	29-Mar-2023	29-Mar-2023	✓	31-Mar-2023	08-May-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
<b>EP080/071: Total Petroleum Hydrocarbons</b>							
Amber Glass Bottle - Unpreserved (EP071) FD02	22-Mar-2023	29-Mar-2023	29-Mar-2023	✓	01-Apr-2023	08-May-2023	✓
Clear glass VOC vial - HCl (EP080) FD02	22-Mar-2023	31-Mar-2023	05-Apr-2023	✓	31-Mar-2023	05-Apr-2023	✓
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>							
Amber Glass Bottle - Unpreserved (EP071) FD02	22-Mar-2023	29-Mar-2023	29-Mar-2023	✓	01-Apr-2023	08-May-2023	✓
Clear glass VOC vial - HCl (EP080) FD02	22-Mar-2023	31-Mar-2023	05-Apr-2023	✓	31-Mar-2023	05-Apr-2023	✓
<b>EP080: BTEXN</b>							
Clear glass VOC vial - HCl (EP080) FD02	22-Mar-2023	31-Mar-2023	05-Apr-2023	✓	31-Mar-2023	05-Apr-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: **WATER**

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

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
<b>Laboratory Duplicates (DUP)</b>							
Dissolved Mercury by FIMS	EG035F	2	14	14.29	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	16	12.50	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	3	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	11	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
<b>Laboratory Control Samples (LCS)</b>							
Dissolved Mercury by FIMS	EG035F	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	3	33.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	20	15.00	15.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	3	19	15.79	15.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	11	9.09	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
<b>Method Blanks (MB)</b>							
Dissolved Mercury by FIMS	EG035F	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	3	33.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	11	9.09	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
<b>Matrix Spikes (MS)</b>							
Dissolved Mercury by FIMS	EG035F	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	3	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	11	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



## Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl <sub>2</sub> )(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl <sub>2</sub> 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).
Nitrite and Nitrate as N (NO <sub>x</sub> ) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO <sub>3</sub> - F. Combined oxidised Nitrogen (NO <sub>2</sub> +NO <sub>3</sub> ) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)
Total Nitrogen as N (TKN + No <sub>x</sub> ) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO <sub>3</sub> -. This method is compliant with NEPM Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al, Zhang et al. This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015 The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270 Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260 Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM Schedule B(3)
Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)



Page : 6 of 6  
Work Order : ES2310057  
Client : GHD PTY LTD  
Project : 12584780



<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for purging.

### CHAIN OF CUSTODY RECORD

**CLIENT DETAILS**

Company Name: <b>GHD</b>	Contact Name: <b>Lachlan Parkinson</b>	Purchase Order: <b>12584780</b>	COC Number:
Office Address: <b>L3, 24 Honeysuckle Drive</b>	Project Manager: <b>Leslie Maranciak</b>	PROJECT Number: <b>12584780</b>	Eurofins   mgt quote ID: <b>180501GHD</b>
<b>Newcastle 2300</b>	Email for results: <b>Leslie.Maranciak@ghd.com</b> <b>Lachlan.Parkinson@ghd.com</b>	PROJECT Name: <b>Aurizon Hexham Water Monitoring</b>	Data output format: <b>ESDAT</b>

Special Directions & Comments: <b>Please ensure fecal coliforms are reported in CFU/100ml</b>	<b>Analytes</b>										Some common holding times (with correct preservation). For further information contact the lab			
	Dissolved Metals (Al, As, Cd, Cr, Cu, Fe, Pb, Hg, Ni, Zn) pH, Conductivity, Turbidity, Suspended Solids Ammonia Total Nitrate (Nitrate), Total Nitrogen (NO3), Total P Thermotolerant Coliforms (CFU/100ml) BOD 5 Day Send to ALS - same analysis as F001 at ALS please Total Metals (10 Elements)										<b>Waters</b>		<b>Soils</b>	
										BTEX, MAH, VOC TRH, PAH, Phenols, Pesticides Heavy Metals Mercury, CrVI Microbiological testing BOD, Nitrate, Nitrite, Total N Solids - TSS, TDS etc Ferrous iron	14 days 7 days 6 months 28 days 24 hours 2 days 7 days 7 days	BTEX, MAH, VOC TRH, PAH, Phenols, Pesticides Heavy Metals Mercury, CrVI Microbiological testing Anions SPOCAS, pH Field and FOX, GS ASLP, TCLP	14 days 14 days 6 months 28 days 72 hours 28 days 24 hours 7 days	

Sample ID	Date	Matrix	B4 (BTEXN / TRH / PAH)	Dissolved Metals (Al, As, Cd, Cr, Cu, Fe, Pb, Hg, Ni, Zn)	pH, Conductivity, Turbidity, Suspended Solids	Ammonia	Total Nitrate (Nitrate), Total Nitrogen (NO3), Total P	Thermotolerant Coliforms (CFU/100ml)	BOD 5 Day	Send to ALS - same analysis as F001 at ALS please	Total Metals (10 Elements)
1 MW01R	22/3/23	W	X	X	X	X	X	X	X		
2 101R		W	X	X	X	X	X	X	X		
3 MW101R		W	X	X	X	X	X	X	X		
4 MW106R		W	X	X	X	X	X	X	X		
5 MW108R		W	X	X	X	X	X	X	X		
6 MW109		W	X	X	X	X	X	X	X		
7 MW301R		W	X	X	X	X	X	X	X		
8 MW02		W	X	X	X	X	X	X	X		
9 MW307R		W	X	X	X	X	X	X	X		
10 MW308R		W	X	X	X	X	X	X	X		
11 MW302R		W	X	X	X	X	X	X	X		
12 FD01		W	X	X			X				
13 FD02		W								X	
14 Basin 1		W	X	X	X	X	X	X	X		X
15 RB01		W	X	X	X	X	X	X	X		X
16 RB02		W	X	X	X	X	X	X	X		X
17 Basin 3		W	X	X	X	X	X	X	X		X

**Environmental Division**  
**Sydney**  
 Work Order Reference  
**ES2310057**



Telephone: +61-2-8784 8665

**HT**

Send to ALS for Same Analysis as FD01

Temperature on arrival:  
**13.3**

Report number:  
**974247**

Relinquished By: <b>L. Parkinson</b>	Received By: <b>Judith Slousova</b>	Turn around time: 1 DAY <input type="checkbox"/> 2 DAY <input type="checkbox"/> 3 DAY <input type="checkbox"/> 4 DAY <input checked="" type="checkbox"/> 18 DAY <input type="checkbox"/> Other: _____	Method Of Shipment: <input type="checkbox"/> Courier <input type="checkbox"/> Hand Delivered <input type="checkbox"/> Postal Courier Consignment #: _____	Temperature on arrival: <b>13.3</b>
Date & Time: <b>22/3/23</b>	Date & Time: <b>22/3/23 1:55 PM</b>			Report number: <b>974247</b>
Signature: <b>[Signature]</b>	Signature: <b>[Signature]</b>			

Rec: Jack 27/03/23 1725

GHD Pty Ltd  
3/24 Honeysuckle Dve  
Newcastle  
NSW 2300



NATA Accredited  
Accreditation Number 1261  
Site Number 18217

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

Attention: **Leslie Maranciak**

Report **1002645-W**  
Project name **AURIZON HEXHAM WATER MONITORING**  
Project ID **12611010**  
Received Date **Jun 27, 2023**

Client Sample ID			BASIN 1	BASIN 3	RB01	MW01R
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N23-Jn0061580	N23-Jn0061581	N23-Jn0061582	N23-Jn0061584
Date Sampled			Jun 27, 2023	Jun 27, 2023	Jun 27, 2023	Jun 27, 2023
Test/Reference	LOR	Unit				
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	2.1	< 0.1	0.8
TRH C29-C36	0.1	mg/L	< 0.1	1.2	< 0.1	0.3
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	3.3	< 0.1	1.1
<b>BTEX</b>						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	89	100	92	94
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>						
Naphthalene <sup>N02</sup>	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH >C10-C16 less Naphthalene (F2) <sup>N01</sup>	0.05	mg/L	< 0.05	0.07	< 0.05	< 0.05
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1) <sup>N04</sup>	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
<b>Polycyclic Aromatic Hydrocarbons</b>						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene <sup>N07</sup>	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1,2,3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001

Client Sample ID			BASIN 1	BASIN 3	RB01	MW01R
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N23-Jn0061580	N23-Jn0061581	N23-Jn0061582	N23-Jn0061584
Date Sampled			Jun 27, 2023	Jun 27, 2023	Jun 27, 2023	Jun 27, 2023
Test/Reference	LOR	Unit				
<b>Polycyclic Aromatic Hydrocarbons</b>						
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	<sup>Q09</sup> INT	54	<sup>Q09</sup> INT	<sup>Q09</sup> INT
p-Terphenyl-d14 (surr.)	1	%	77	77	113	135
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>						
TRH >C10-C16	0.05	mg/L	< 0.05	0.07	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	2.7	< 0.1	0.9
TRH >C34-C40	0.1	mg/L	< 0.1	2.3	< 0.1	1.0
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	5.07	< 0.1	1.9
<b>Water Quality Parameters</b>						
Ammonia (as N)	0.01	mg/L	0.23	2.0	-	0.56
Biochemical Oxygen Demand (BOD-5 Day)	5	mg/L	< 5	49	-	< 5
Conductivity (at 25 °C)	10	uS/cm	1600	1400	-	7400
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.25
Nitrate (as N)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.25
Nitrite (as N)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.25
pH (at 25 °C)	0.1	pH Units	8.0	7.6	-	6.8
Phosphate total (as P)	0.01	mg/L	0.47	4.9	< 0.01	0.08
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	0.4	23	0.3	1.4
Total Nitrogen (as N)*	0.1	mg/L	0.4	23	0.3	1.4
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	5.6	800	-	73
Turbidity	1	NTU	1.6	15	-	91
Thermotolerant Coliforms	1	CFU/100mL	37	470	-	< 1
<b>Heavy Metals</b>						
Aluminium	0.05	mg/L	< 0.05	5.5	< 0.05	-
Aluminium (filtered)	0.05	mg/L	-	-	-	0.10
Arsenic	0.001	mg/L	0.002	< 0.001	< 0.001	-
Arsenic (filtered)	0.001	mg/L	-	-	-	0.003
Cadmium	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	-
Cadmium (filtered)	0.0002	mg/L	-	-	-	< 0.0002
Chromium	0.001	mg/L	< 0.001	0.002	< 0.001	-
Chromium (filtered)	0.001	mg/L	-	-	-	< 0.001
Copper	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Copper (filtered)	0.001	mg/L	-	-	-	< 0.001
Iron	0.05	mg/L	0.05	39	< 0.05	-
Iron (filtered)	0.05	mg/L	-	-	-	180
Lead	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Lead (filtered)	0.001	mg/L	-	-	-	< 0.001
Mercury	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	-
Mercury (filtered)	0.0001	mg/L	-	-	-	< 0.0001
Nickel	0.001	mg/L	< 0.001	0.14	< 0.001	-
Nickel (filtered)	0.001	mg/L	-	-	-	0.12
Zinc	0.005	mg/L	< 0.005	0.10	< 0.005	-
Zinc (filtered)	0.005	mg/L	-	-	-	0.031

Client Sample ID			101R	MW101R	MW106R	MW108R
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N23-Jn0061585	N23-Jn0061586	N23-Jn0061587	N23-Jn0061588
Date Sampled			Jun 27, 2023	Jun 27, 2023	Jun 27, 2023	Jun 27, 2023
Test/Reference	LOR	Unit				
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
<b>BTEX</b>						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	96	92	93	86
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>						
Naphthalene <sup>N02</sup>	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH >C10-C16 less Naphthalene (F2) <sup>N01</sup>	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1) <sup>N04</sup>	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
<b>Polycyclic Aromatic Hydrocarbons</b>						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene <sup>N07</sup>	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1,2,3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	58	<sup>Q09</sup> INT	<sup>Q09</sup> INT	<sup>Q09</sup> INT
p-Terphenyl-d14 (surr.)	1	%	119	77	141	99
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>						
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Ammonia (as N)	0.01	mg/L	4.0	1.2	< 0.01	0.04
Biochemical Oxygen Demand (BOD-5 Day)	5	mg/L	< 5	8.5	< 5	< 5
Conductivity (at 25 °C)	10	uS/cm	9600	13000	600	4500
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05	0.09	< 0.05	< 0.05
Nitrate (as N)	0.02	mg/L	< 0.02	0.09	< 0.02	< 0.02

Client Sample ID			101R	MW101R	MW106R	MW108R
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N23-Jn0061585	N23-Jn0061586	N23-Jn0061587	N23-Jn0061588
Date Sampled			Jun 27, 2023	Jun 27, 2023	Jun 27, 2023	Jun 27, 2023
Test/Reference	LOR	Unit				
Nitrite (as N)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
pH (at 25 °C)	0.1	pH Units	7.5	7.4	7.5	7.8
Phosphate total (as P)	0.01	mg/L	0.20	0.34	0.11	0.06
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	3.0	2.5	0.5	< 0.2
Total Nitrogen (as N)*	0.1	mg/L	3	2.59	0.5	< 0.2
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	53	120	24	17
Turbidity	1	NTU	25	74	3.9	8.5
Thermotolerant Coliforms	1	CFU/100mL	< 1	M217	< 1	< 1
<b>Heavy Metals</b>						
Aluminium (filtered)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Arsenic (filtered)	0.001	mg/L	0.002	0.004	< 0.001	< 0.001
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	0.004	0.001	0.002	< 0.001
Iron (filtered)	0.05	mg/L	17	7.2	0.09	1.5
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	0.006	0.018	0.003	0.006
Zinc (filtered)	0.005	mg/L	< 0.005	0.062	0.006	0.029

Client Sample ID			MW109	MW301R	MW02	MW307R
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N23-Jn0061589	N23-Jn0061590	N23-Jn0061591	N23-Jn0061592
Date Sampled			Jun 27, 2023	Jun 27, 2023	Jun 27, 2023	Jun 27, 2023
Test/Reference	LOR	Unit				
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
<b>BTEX</b>						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	120	93	88	84
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>						
Naphthalene <sup>N02</sup>	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH >C10-C16 less Naphthalene (F2) <sup>N01</sup>	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1) <sup>N04</sup>	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02

Client Sample ID			MW109	MW301R	MW02	MW307R
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N23-Jn0061589	N23-Jn0061590	N23-Jn0061591	N23-Jn0061592
Date Sampled			Jun 27, 2023	Jun 27, 2023	Jun 27, 2023	Jun 27, 2023
Test/Reference	LOR	Unit				
<b>Polycyclic Aromatic Hydrocarbons</b>						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene <sup>N07</sup>	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	<sup>Q09</sup> INT	<sup>Q09</sup> INT	<sup>Q09</sup> INT	<sup>Q09</sup> INT
p-Terphenyl-d14 (surr.)	1	%	77	86	94	83
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>						
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
<b>Ammonia (as N)</b>						
Ammonia (as N)	0.01	mg/L	0.57	3.0	1.8	27
<b>Biochemical Oxygen Demand (BOD-5 Day)</b>						
Biochemical Oxygen Demand (BOD-5 Day)	5	mg/L	5.3	22	< 5	49
<b>Conductivity (at 25 °C)</b>						
Conductivity (at 25 °C)	10	uS/cm	6100	13000	2600	32000
<b>Nitrate &amp; Nitrite (as N)</b>						
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05	0.13	< 0.05	< 0.25
<b>Nitrate (as N)</b>						
Nitrate (as N)	0.02	mg/L	< 0.02	0.10	< 0.02	< 0.25
<b>Nitrite (as N)</b>						
Nitrite (as N)	0.02	mg/L	< 0.02	0.02	< 0.02	< 0.1
<b>pH (at 25 °C)</b>						
pH (at 25 °C)	0.1	pH Units	7.9	7.6	6.9	7.7
<b>Phosphate total (as P)</b>						
Phosphate total (as P)	0.01	mg/L	10	3.2	0.88	17
<b>Total Kjeldahl Nitrogen (as N)</b>						
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	0.6	3.0	2.5	18
<b>Total Nitrogen (as N)*</b>						
Total Nitrogen (as N)*	0.1	mg/L	0.6	3.13	2.5	18
<b>Total Suspended Solids Dried at 103 °C to 105 °C</b>						
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	130	100	24	56
<b>Turbidity</b>						
Turbidity	1	NTU	37	160	15	15
<b>Thermotolerant Coliforms</b>						
Thermotolerant Coliforms	1	CFU/100mL	< 1	13	< 1	< 1
<b>Heavy Metals</b>						
<b>Aluminium (filtered)</b>						
Aluminium (filtered)	0.05	mg/L	< 0.05	< 0.05	0.07	0.05
<b>Arsenic (filtered)</b>						
Arsenic (filtered)	0.001	mg/L	0.001	< 0.001	0.014	< 0.001
<b>Cadmium (filtered)</b>						
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
<b>Chromium (filtered)</b>						
Chromium (filtered)	0.001	mg/L	0.001	< 0.001	< 0.001	< 0.001
<b>Copper (filtered)</b>						
Copper (filtered)	0.001	mg/L	< 0.001	< 0.001	0.002	< 0.001
<b>Iron (filtered)</b>						
Iron (filtered)	0.05	mg/L	0.88	3.1	61	0.11
<b>Lead (filtered)</b>						
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
<b>Mercury (filtered)</b>						
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
<b>Nickel (filtered)</b>						
Nickel (filtered)	0.001	mg/L	< 0.001	0.002	0.062	< 0.001
<b>Zinc (filtered)</b>						
Zinc (filtered)	0.005	mg/L	0.022	< 0.005	0.10	< 0.005

Client Sample ID			MW308R	MW302R	FD01
Sample Matrix			Water	Water	Water
Eurofins Sample No.			N23-Jn0061593	N23-Jn0061594	N23-Jn0061595
Date Sampled			Jun 27, 2023	Jun 27, 2023	Jun 27, 2023
Test/Reference	LOR	Unit			
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>					
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1
<b>BTEX</b>					
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	87	96	89
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>					
Naphthalene <sup>N02</sup>	0.01	mg/L	< 0.01	< 0.01	< 0.01
TRH >C10-C16 less Naphthalene (F2) <sup>N01</sup>	0.05	mg/L	< 0.05	< 0.05	< 0.05
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1) <sup>N04</sup>	0.02	mg/L	< 0.02	< 0.02	< 0.02
<b>Polycyclic Aromatic Hydrocarbons</b>					
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene <sup>N07</sup>	0.001	mg/L	< 0.001	< 0.001	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Indeno(1,2,3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	<sup>Q09</sup> INT	<sup>Q09</sup> INT	<sup>Q09</sup> INT
p-Terphenyl-d14 (surr.)	1	%	89	88	91
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>					
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1
<b>Ammonia (as N)</b>					
Ammonia (as N)	0.01	mg/L	2.4	0.61	-
<b>Biochemical Oxygen Demand (BOD-5 Day)</b>					
Biochemical Oxygen Demand (BOD-5 Day)	5	mg/L	24	< 5	-
<b>Conductivity (at 25 °C)</b>					
Conductivity (at 25 °C)	10	uS/cm	4700	4200	-
<b>Nitrate &amp; Nitrite (as N)</b>					
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05	< 0.05	< 0.05
<b>Nitrate (as N)</b>					
Nitrate (as N)	0.02	mg/L	< 0.02	0.05	< 0.02



Client Sample ID			MW308R	MW302R	FD01
Sample Matrix			Water	Water	Water
Eurofins Sample No.			N23-Jn0061593	N23-Jn0061594	N23-Jn0061595
Date Sampled			Jun 27, 2023	Jun 27, 2023	Jun 27, 2023
Test/Reference	LOR	Unit			
Nitrite (as N)	0.02	mg/L	< 0.02	< 0.02	< 0.02
pH (at 25 °C)	0.1	pH Units	7.5	6.6	-
Phosphate total (as P)	0.01	mg/L	0.61	0.30	0.34
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	1.9	1.1	2.4
Total Nitrogen (as N)*	0.1	mg/L	1.9	1.1	2.4
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	70	160	-
Turbidity	1	NTU	130	44	-
Thermotolerant Coliforms	1	CFU/100mL	< 1	20	-
<b>Heavy Metals</b>					
Aluminium (filtered)	0.05	mg/L	< 0.05	< 0.05	< 0.05
Arsenic (filtered)	0.001	mg/L	0.002	0.001	0.001
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001
Iron (filtered)	0.05	mg/L	12	44	43
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	0.004	0.009	0.009
Zinc (filtered)	0.005	mg/L	< 0.005	0.14	0.14

**Sample History**

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

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

Description	Testing Site	Extracted	Holding Time
<b>Eurofins Suite B4</b>			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Jul 04, 2023	7 Days
BTEX - Method: LTM-ORG-2010 BTEX and Volatile TRH	Sydney	Jun 30, 2023	14 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Jun 30, 2023	7 Days
Polycyclic Aromatic Hydrocarbons - Method: LTM-ORG-2130 PAH and Phenols in Soil and Water	Sydney	Jul 04, 2023	7 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Jul 04, 2023	7 Days
Ammonia (as N) - Method: APHA 4500-NH3 Ammonia Nitrogen by FIA	Melbourne	Jun 29, 2023	28 Days
Biochemical Oxygen Demand (BOD-5 Day) - Method: LTM-INO-4010 Biochemical Oxygen Demand (BOD5) in Water	Melbourne	Jun 29, 2023	2 Days
Conductivity (at 25 °C) - Method: LTM-INO-4030 Conductivity	Melbourne	Jun 29, 2023	28 Days
pH (at 25 °C) - Method: LTM-GEN-7090 pH in water by ISE	Melbourne	Jun 29, 2023	0 Hours
Total Suspended Solids Dried at 103 °C to 105 °C - Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry	Melbourne	Jun 30, 2023	7 Days
Turbidity - Method: Turbidity by classical using APHA 2130B (LTM-INO-4140)	Melbourne	Jun 30, 2023	28 Days
Thermotolerant Coliforms - Method: AS 4276.5 (in-house method LTM-MIC-6010)	Newcastle	Jun 27, 2023	24 Hours
Heavy Metals - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Jul 03, 2023	28 Days
Heavy Metals (filtered) - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Jul 04, 2023	180 Days
Metals M8 - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Jul 03, 2023	28 Days
Metals M8 filtered - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Jul 04, 2023	28 Days
Total Nitrogen Set (as N)			
Nitrate & Nitrite (as N) - Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA	Melbourne	Jun 29, 2023	28 Days
Nitrate (as N) - Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA	Melbourne	Jun 29, 2023	28 Days
Nitrite (as N) - Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA	Melbourne	Jun 29, 2023	2 Days
Total Kjeldahl Nitrogen (as N) - Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA	Melbourne	Jun 29, 2023	28 Days
<b>Eurofins Suite B19A: Total N (TKN, NOx), Total P</b>			
Phosphate total (as P) - Method: LTM-INO-4040 Phosphate by CFA	Melbourne	Jun 29, 2023	28 Days

<b>Company Name:</b>	GHD Pty Ltd NEWCASTLE	<b>Order No.:</b>		<b>Received:</b>	Jun 27, 2023 1:30 PM
<b>Address:</b>	3/24 Honeysuckle Dve Newcastle NSW 2300	<b>Report #:</b>	1002645	<b>Due:</b>	Jul 4, 2023
<b>Project Name:</b>	AURIZON HEXHAM WATER MONITORING	<b>Phone:</b>	02 4979 9999	<b>Priority:</b>	5 Day
<b>Project ID:</b>	12611010	<b>Fax:</b>	02 4979 9988	<b>Contact Name:</b>	Leslie Maranciak

**Eurofins Analytical Services Manager : Andrew Black**

Sample Detail						Aluminium	Aluminium (filtered)	Ammonia (as N)	Biochemical Oxygen Demand (BOD-5 Day)	Conductivity (at 25 °C)	HOLD	Iron	Iron (filtered)	pH (at 25 °C)	Thermotolerant Coliforms	Total Suspended Solids Dried at 103 °C to 105 °C	Turbidity	Metals M8	Metals M8 filtered	Eurofins Suite B4	Eurofins Suite B19A: Total N (TKN, NOx), Total P	
<b>Melbourne Laboratory - NATA # 1261 Site # 1254</b>								X	X	X	X			X		X	X					X
<b>Sydney Laboratory - NATA # 1261 Site # 18217</b>						X	X					X	X					X	X	X	X	X
<b>Mayfield Laboratory - NATA # 1261 Site # 25079 &amp; 25289</b>															X							
<b>External Laboratory</b>																						
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID																	
1	BASIN 1	Jun 27, 2023		Water	N23-Jn0061580	X		X	X	X		X		X	X	X	X	X		X	X	X
2	BASIN 3	Jun 27, 2023		Water	N23-Jn0061581	X		X	X	X		X		X	X	X	X	X		X	X	X
3	RB01	Jun 27, 2023		Water	N23-Jn0061582	X						X						X		X	X	X
4	RB02	Jun 27, 2023		Water	N23-Jn0061583						X											
5	MW01R	Jun 27, 2023		Water	N23-Jn0061584		X	X	X	X			X	X	X	X	X		X	X	X	X
6	101R	Jun 27, 2023		Water	N23-Jn0061585		X	X	X	X			X	X	X	X	X		X	X	X	X
7	MW101R	Jun 27, 2023		Water	N23-Jn0061586		X	X	X	X			X	X	X	X	X		X	X	X	X
8	MW106R	Jun 27, 2023		Water	N23-Jn0061587		X	X	X	X			X	X	X	X	X		X	X	X	X
9	MW108R	Jun 27, 2023		Water	N23-Jn0061588		X	X	X	X			X	X	X	X	X		X	X	X	X
10	MW109	Jun 27, 2023		Water	N23-Jn0061589		X	X	X	X			X	X	X	X	X		X	X	X	X
11	MW301R	Jun 27, 2023		Water	N23-Jn0061590		X	X	X	X			X	X	X	X	X		X	X	X	X

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 Newcastle  
 NSW 2300

**Order No.:**  
**Report #:** 1002645  
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**Received:** Jun 27, 2023 1:30 PM  
**Due:** Jul 4, 2023  
**Priority:** 5 Day  
**Contact Name:** Leslie Maranciak

**Project Name:** AURIZON HEXHAM WATER MONITORING  
**Project ID:** 12611010

**Eurofins Analytical Services Manager : Andrew Black**

Sample Detail						Aluminium	Aluminium (filtered)	Ammonia (as N)	Biochemical Oxygen Demand (BOD-5 Day)	Conductivity (at 25 °C)	HOLD	Iron	Iron (filtered)	pH (at 25 °C)	Thermotolerant Coliforms	Total Suspended Solids Dried at 103 °C to 105 °C	Turbidity	Metals M8	Metals M8 filtered	Eurofins Suite B4	Eurofins Suite B19A: Total N (TKN, NOx), Total P	
<b>Melbourne Laboratory - NATA # 1261 Site # 1254</b>								X	X	X	X			X		X	X					X
<b>Sydney Laboratory - NATA # 1261 Site # 18217</b>						X	X					X	X					X	X	X	X	X
<b>Mayfield Laboratory - NATA # 1261 Site # 25079 &amp; 25289</b>															X							
12	MW02	Jun 27, 2023		Water	N23-Jn0061591	X	X	X	X			X	X	X	X	X	X		X	X	X	X
13	MW307R	Jun 27, 2023		Water	N23-Jn0061592	X	X	X	X			X	X	X	X	X	X		X	X	X	X
14	MW308R	Jun 27, 2023		Water	N23-Jn0061593	X	X	X	X			X	X	X	X	X	X		X	X	X	X
15	MW302R	Jun 27, 2023		Water	N23-Jn0061594	X	X	X	X			X	X	X	X	X	X		X	X	X	X
16	FD01	Jun 27, 2023		Water	N23-Jn0061595	X						X							X	X	X	X
<b>Test Counts</b>						3	13	13	13	13	1	3	13	13	13	13	13	3	13	15	15	

## Internal Quality Control Review and Glossary

### General

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

### Holding Times

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

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

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

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

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

### Units

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

### Terms

<b>APHA</b>	American Public Health Association
<b>COC</b>	Chain of Custody
<b>CP</b>	Client Parent - QC was performed on samples pertaining to this report
<b>CRM</b>	Certified Reference Material (ISO17034) - reported as percent recovery.
<b>Dry</b>	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
<b>Duplicate</b>	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
<b>LOR</b>	Limit of Reporting.
<b>LCS</b>	Laboratory Control Sample - reported as percent recovery.
<b>Method Blank</b>	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
<b>NCP</b>	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
<b>RPD</b>	Relative Percent Difference between two Duplicate pieces of analysis.
<b>SPIKE</b>	Addition of the analyte to the sample and reported as percentage recovery.
<b>SRA</b>	Sample Receipt Advice
<b>Surr - Surrogate</b>	The addition of a like compound to the analyte target and reported as percentage recovery.
<b>TBTO</b>	Tributyltin oxide ( <i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
<b>TCLP</b>	Toxicity Characteristic Leaching Procedure
<b>TEQ</b>	Toxic Equivalency Quotient or Total Equivalence
<b>QSM</b>	US Department of Defense Quality Systems Manual Version 5.4
<b>US EPA</b>	United States Environmental Protection Agency
<b>WA DWER</b>	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

### QC - Acceptance Criteria

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

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

Results <10 times the LOR: No Limit

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

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

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

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

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

### QC Data General Comments

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

**Quality Control Results**

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Method Blank</b>							
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
<b>Method Blank</b>							
<b>BTEX</b>							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total*	mg/L	< 0.003			0.003	Pass	
<b>Method Blank</b>							
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>							
Naphthalene	mg/L	< 0.01			0.01	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
<b>Method Blank</b>							
<b>Polycyclic Aromatic Hydrocarbons</b>							
Acenaphthene	mg/L	< 0.001			0.001	Pass	
Acenaphthylene	mg/L	< 0.001			0.001	Pass	
Anthracene	mg/L	< 0.001			0.001	Pass	
Benz(a)anthracene	mg/L	< 0.001			0.001	Pass	
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.001			0.001	Pass	
Benzo(g,h,i)perylene	mg/L	< 0.001			0.001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.001			0.001	Pass	
Chrysene	mg/L	< 0.001			0.001	Pass	
Dibenz(a,h)anthracene	mg/L	< 0.001			0.001	Pass	
Fluoranthene	mg/L	< 0.001			0.001	Pass	
Fluorene	mg/L	< 0.001			0.001	Pass	
Indeno(1,2,3-cd)pyrene	mg/L	< 0.001			0.001	Pass	
Naphthalene	mg/L	< 0.001			0.001	Pass	
Phenanthrene	mg/L	< 0.001			0.001	Pass	
Pyrene	mg/L	< 0.001			0.001	Pass	
<b>Method Blank</b>							
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>							
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
<b>Method Blank</b>							
Ammonia (as N)	mg/L	< 0.01			0.01	Pass	
Biochemical Oxygen Demand (BOD-5 Day)	mg/L	< 5			5	Pass	
Conductivity (at 25 °C)	uS/cm	< 10			10	Pass	
Nitrate & Nitrite (as N)	mg/L	< 0.05			0.05	Pass	
Nitrate (as N)	mg/L	< 0.02			0.02	Pass	
Nitrite (as N)	mg/L	< 0.02			0.02	Pass	
Phosphate total (as P)	mg/L	< 0.01			0.01	Pass	
Total Kjeldahl Nitrogen (as N)	mg/L	< 0.2			0.2	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	mg/L	< 5			5	Pass	
<b>Method Blank</b>							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Heavy Metals</b>							
Aluminium	mg/L	< 0.05			0.05	Pass	
Aluminium (filtered)	mg/L	< 0.05			0.05	Pass	
Arsenic	mg/L	< 0.001			0.001	Pass	
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Cadmium (filtered)	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Iron	mg/L	< 0.05			0.05	Pass	
Iron (filtered)	mg/L	< 0.05			0.05	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
<b>LCS - % Recovery</b>							
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>							
TRH C6-C9	%	89			70-130	Pass	
TRH C10-C14	%	126			70-130	Pass	
<b>LCS - % Recovery</b>							
<b>BTEX</b>							
Benzene	%	95			70-130	Pass	
Toluene	%	84			70-130	Pass	
Ethylbenzene	%	101			70-130	Pass	
m&p-Xylenes	%	104			70-130	Pass	
o-Xylene	%	101			70-130	Pass	
Xylenes - Total*	%	103			70-130	Pass	
<b>LCS - % Recovery</b>							
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>							
Naphthalene	%	109			70-130	Pass	
TRH C6-C10	%	89			70-130	Pass	
<b>LCS - % Recovery</b>							
<b>Polycyclic Aromatic Hydrocarbons</b>							
Acenaphthene	%	70			70-130	Pass	
Acenaphthylene	%	79			70-130	Pass	
Anthracene	%	111			70-130	Pass	
Benz(a)anthracene	%	101			70-130	Pass	
Benzo(a)pyrene	%	90			70-130	Pass	
Benzo(b&j)fluoranthene	%	83			70-130	Pass	
Benzo(g,h,i)perylene	%	101			70-130	Pass	
Benzo(k)fluoranthene	%	84			70-130	Pass	
Chrysene	%	96			70-130	Pass	
Dibenz(a,h)anthracene	%	89			70-130	Pass	
Fluoranthene	%	101			70-130	Pass	
Fluorene	%	93			70-130	Pass	
Indeno(1,2,3-cd)pyrene	%	85			70-130	Pass	
Naphthalene	%	70			70-130	Pass	
Phenanthrene	%	98			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code	
Pyrene	%	115			70-130	Pass		
<b>LCS - % Recovery</b>								
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>								
TRH >C10-C16	%	124			70-130	Pass		
<b>LCS - % Recovery</b>								
Ammonia (as N)	%	102			70-130	Pass		
Conductivity (at 25 °C)	%	106			70-130	Pass		
Nitrate & Nitrite (as N)	%	103			70-130	Pass		
Nitrate (as N)	%	103			70-130	Pass		
Nitrite (as N)	%	102			70-130	Pass		
Phosphate total (as P)	%	95			70-130	Pass		
Total Kjeldahl Nitrogen (as N)	%	89			70-130	Pass		
Total Suspended Solids Dried at 103 °C to 105 °C	%	96			70-130	Pass		
<b>LCS - % Recovery</b>								
<b>Heavy Metals</b>								
Aluminium	%	94			80-120	Pass		
Aluminium (filtered)	%	106			80-120	Pass		
Arsenic	%	85			80-120	Pass		
Arsenic (filtered)	%	95			80-120	Pass		
Cadmium	%	88			80-120	Pass		
Cadmium (filtered)	%	100			80-120	Pass		
Chromium	%	96			80-120	Pass		
Chromium (filtered)	%	104			80-120	Pass		
Copper	%	106			80-120	Pass		
Copper (filtered)	%	104			80-120	Pass		
Iron	%	95			80-120	Pass		
Iron (filtered)	%	118			80-120	Pass		
Lead	%	102			80-120	Pass		
Lead (filtered)	%	103			80-120	Pass		
Mercury	%	102			80-120	Pass		
Mercury (filtered)	%	98			80-120	Pass		
Nickel	%	96			80-120	Pass		
Nickel (filtered)	%	103			80-120	Pass		
Zinc	%	94			80-120	Pass		
Zinc (filtered)	%	118			80-120	Pass		
Test	Lab Sample ID	QA Source	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
<b>Spike - % Recovery</b>								
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>								
TRH C10-C14	S23-Jn0072194	NCP	%	85		70-130	Pass	
<b>Spike - % Recovery</b>								
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>								
TRH >C10-C16	S23-Jn0072194	NCP	%	84		70-130	Pass	
<b>Spike - % Recovery</b>								
				Result 1				
Ammonia (as N)	N23-Jn0063912	NCP	%	106		70-130	Pass	
Nitrate & Nitrite (as N)	N23-Jn0063912	NCP	%	129		70-130	Pass	
Nitrate (as N)	N23-Jn0063912	NCP	%	129		70-130	Pass	
Total Kjeldahl Nitrogen (as N)	M23-Jn0065702	NCP	%	105		70-130	Pass	
<b>Spike - % Recovery</b>								
<b>Heavy Metals</b>								
				Result 1				
Arsenic	N23-Jn0063025	NCP	%	89		75-125	Pass	
Cadmium	N23-Jn0063025	NCP	%	90		75-125	Pass	
Chromium	N23-Jn0063025	NCP	%	92		75-125	Pass	
Copper	N23-Jn0063025	NCP	%	96		75-125	Pass	



Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Iron	N23-Jn0063025	NCP	%	93			75-125	Pass	
Lead	N23-Jn0063025	NCP	%	98			75-125	Pass	
Mercury	N23-Jn0063025	NCP	%	100			75-125	Pass	
Nickel	N23-Jn0063025	NCP	%	89			75-125	Pass	
Zinc	N23-Jn0063025	NCP	%	86			75-125	Pass	
<b>Spike - % Recovery</b>									
<b>Heavy Metals</b>				Result 1					
Iron (filtered)	S23-Jn0072083	NCP	%	81			75-125	Pass	
<b>Spike - % Recovery</b>									
<b>Heavy Metals</b>				Result 1					
Phosphate total (as P)	N23-Jn0061591	CP	%	96			70-130	Pass	
<b>Spike - % Recovery</b>									
<b>Heavy Metals</b>				Result 1					
Aluminium (filtered)	N23-Jn0061595	CP	%	101			75-125	Pass	
Arsenic (filtered)	N23-Jn0061595	CP	%	100			75-125	Pass	
Cadmium (filtered)	N23-Jn0061595	CP	%	101			75-125	Pass	
Chromium (filtered)	N23-Jn0061595	CP	%	91			75-125	Pass	
Copper (filtered)	N23-Jn0061595	CP	%	89			75-125	Pass	
Lead (filtered)	N23-Jn0061595	CP	%	92			75-125	Pass	
Mercury (filtered)	N23-Jn0061595	CP	%	83			75-125	Pass	
Nickel (filtered)	N23-Jn0061595	CP	%	88			75-125	Pass	
Zinc (filtered)	N23-Jn0061595	CP	%	81			75-125	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Duplicate</b>									
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>				Result 1	Result 2	RPD			
TRH C6-C9	S23-Jn0070703	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C10-C14	S23-Jn0058771	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	S23-Jn0058771	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	S23-Jn0058771	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
<b>Duplicate</b>									
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>				Result 1	Result 2	RPD			
TRH C6-C10	S23-Jn0070703	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
<b>Duplicate</b>									
<b>Polycyclic Aromatic Hydrocarbons</b>				Result 1	Result 2	RPD			
Acenaphthene	S23-Jn0070703	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Acenaphthylene	S23-Jn0070703	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Anthracene	S23-Jn0070703	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benz(a)anthracene	S23-Jn0070703	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(a)pyrene	S23-Jn0070703	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(b&i)fluoranthene	S23-Jn0070703	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(g,h,i)perylene	S23-Jn0070703	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(k)fluoranthene	S23-Jn0070703	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Chrysene	S23-Jn0070703	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Dibenz(a,h)anthracene	S23-Jn0070703	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluoranthene	S23-Jn0070703	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluorene	S23-Jn0070703	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Indeno(1,2,3-cd)pyrene	S23-Jn0070703	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Naphthalene	S23-Jn0070703	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Phenanthrene	S23-Jn0070703	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Pyrene	S23-Jn0070703	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
<b>Duplicate</b>									
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>				Result 1	Result 2	RPD			
TRH >C10-C16	S23-Jn0058771	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH >C16-C34	S23-Jn0058771	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C34-C40	S23-Jn0058771	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	

Duplicate								
				Result 1	Result 2	RPD		
Biochemical Oxygen Demand (BOD-5 Day)	N23-Jn0061580	CP	mg/L	< 5	< 5	<1	30%	Pass
Nitrate & Nitrite (as N)	N23-Jn0061580	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass
Total Suspended Solids Dried at 103 °C to 105 °C	M23-Jn0052035	NCP	mg/L	36	43	17	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Aluminium	S23-Jn0058070	NCP	mg/L	0.07	0.13	59	30%	Fail
Lead	N23-Jn0060228	NCP	mg/L	0.006	0.006	1.3	30%	Pass
Zinc	S23-Jn0058070	NCP	mg/L	0.015	0.014	8.1	30%	Pass
Duplicate								
BTEX				Result 1	Result 2	RPD		
Benzene	N23-Jn0061582	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Toluene	N23-Jn0061582	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Ethylbenzene	N23-Jn0061582	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
m&p-Xylenes	N23-Jn0061582	CP	mg/L	< 0.002	< 0.002	<1	30%	Pass
o-Xylene	N23-Jn0061582	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Xylenes - Total*	N23-Jn0061582	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass
Duplicate								
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD		
Naphthalene	N23-Jn0061582	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Arsenic	N23-Jn0061582	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Cadmium	N23-Jn0061582	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Chromium	N23-Jn0061582	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Copper	N23-Jn0061582	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Iron	N23-Jn0061582	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass
Mercury	N23-Jn0061582	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Nickel	N23-Jn0061582	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Aluminium (filtered)	R23-Jn0063597	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass
Arsenic (filtered)	R23-Jn0063597	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Cadmium (filtered)	R23-Jn0063597	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Chromium (filtered)	R23-Jn0063597	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Copper (filtered)	R23-Jn0063597	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Iron (filtered)	R23-Jn0063597	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass
Lead (filtered)	R23-Jn0063597	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Mercury (filtered)	R23-Jn0063597	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Nickel (filtered)	R23-Jn0063597	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Zinc (filtered)	R23-Jn0063597	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Phosphate total (as P)	N23-Jn0061585	CP	mg/L	0.20	0.18	11	30%	Pass
Total Kjeldahl Nitrogen (as N)	N23-Jn0061585	CP	mg/L	3.0	3.6	27	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Phosphate total (as P)	N23-Jn0061587	CP	mg/L	0.11	0.10	4.1	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Conductivity (at 25 °C)	N23-Jn0061588	CP	uS/cm	4500	4500	<1	30%	Pass
pH (at 25 °C)	N23-Jn0061588	CP	pH Units	7.8	7.8	pass	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Phosphate total (as P)	N23-Jn0061591	CP	mg/L	0.88	0.84	4.5	30%	Pass

Duplicate								
				Result 1	Result 2	RPD		
Ammonia (as N)	M23-JI0010696	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass
Nitrate (as N)	M23-JI0010696	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass
Nitrite (as N)	M23-JI0010696	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass

**Comments**
**Sample Integrity**

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

**Qualifier Codes/Comments**

Code	Description
M21	Count is an estimate only
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q09	The Surrogate recovery is outside of the recommended acceptance criteria due to matrix interference. Acceptance criteria were met for all other QC

**Authorised by:**

Andrew Black	Analytical Services Manager
Caitlin Breeze	Senior Analyst-Inorganic
Fang Yee Tan	Senior Analyst-Metal
Mary Makarios	Senior Analyst-Inorganic
Mickael Ros	Senior Analyst-Metal
Roopesh Rangarajan	Senior Analyst-Organic
Roopesh Rangarajan	Senior Analyst-Volatile



**Glenn Jackson**  
**Managing Director**

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

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

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**Eurofins Environment Testing Australia Pty Ltd**

ABN: 50 005 085 521

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6 Monterey Road Dandenong South VIC 3175 Tel: +61 3 8564 5000 NATA# 1261 Site# 1254	19/8 Lewalan Street Grovedale VIC 3216 Tel: +61 3 8564 5000 NATA# 1261 Site# 25403	179 Magowar Road Girraween NSW 2145 Tel: +61 2 9900 8400 NATA# 1261 Site# 18217	Unit 1,2 Dacre Street Mitchell ACT 2911 Tel: +61 2 6113 8091 NATA# 1261 Site# 25466	1/21 Smallwood Place Murarrie QLD 4172 Tel: +61 7 3902 4600 NATA# 1261 Site# 20794	1/2 Frost Drive Mayfield West NSW 2304 Tel: +61 2 4968 8448 NATA# 1261 Site# 25079 & 25289

**Eurofins ARL Pty Ltd**

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46-48 Banksia Road Welshpool WA 6106 Tel: +61 8 6253 4444 NATA# 2377 Site# 2370

**Eurofins Environment Testing NZ Ltd**

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Auckland	Christchurch
35 O'Rorke Road Penrose, Auckland 1061 Tel: +64 9 526 4551 IANZ# 1327	43 Detroit Drive Rolleston, Christchurch 7675 Tel: +64 3 343 5201 IANZ# 1290

## Sample Receipt Advice

<b>Company name:</b>	GHD Pty Ltd NEWCASTLE
<b>Contact name:</b>	Leslie Maranciak
<b>Project name:</b>	AURIZON HEXHAM WATER MONITORING
<b>Project ID:</b>	12611010
<b>Turnaround time:</b>	5 Day
<b>Date/Time received</b>	Jun 27, 2023 1:30 PM
<b>Eurofins reference</b>	1002645

## Sample Information

- ✓ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ✓ Sample Temperature of chilled sample on the batch as recorded by Eurofins Sample Receipt : 10.4 degrees Celsius.
- ✓ All samples have been received as described on the above COC.
- ✓ COC has been completed correctly.
- ✓ Attempt to chill was evident.
- ✓ Appropriately preserved sample containers have been used.
- ✓ All samples were received in good condition.
- ✓ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ✓ Appropriate sample containers have been used.
- ✓ Sample containers for volatile analysis received with zero headspace.
- ✓ Split sample sent to requested external lab.
- ✗ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

## Notes

FD02 SENT TO ALS. | RB02 placed on HOLD as requested.

## Contact

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

**Andrew Black on phone : (+61) 2 9900 8490 or by email: AndrewBlack@eurofins.com**

Results will be delivered electronically via email to Leslie Maranciak - leslie.maranciak@ghd.com.

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



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Sydney

Unit F3 - 6 Building F, 16 Mars Road, Lane Cove  
Phone: +612 9900 8400  
Email: enviro.syd@mgtabmark.com.au

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Unit 1-21 Smallwood Place, Murrarie  
Phone: +617 3902 4600  
Email: enviro.bns@mgtabmark.com.au

Melbourne

2 Kingston Town Close, Oakleigh, VIC 3166  
Phone: +613 8564 5000 Fax: +613 8564 5090  
Email: enquires.melb@mgtabmark.com.au

### CHAIN OF CUSTODY RECORD

CLIENT: AILS

Page 1 of 2

Company Name: GHD	Contact Name: Lachlan Parkinson	Purchase Order: 12611010	COC Number:
Office Address: L3, 24 Honeysuckle Drive Newcastle 2300	Project Manager: Leslie Maranciak	PROJECT Number: 12611010	Eurofins   mgt quote ID: 180501GHD
	Email for results: Leslie.Maranciak@ghd.com Lachlan.Parkinson@ghd.com	PROJECT Name: Aurizon Hexham Water Monitoring	Data output format: ESDAT

**Special Directions & Comments:**  
Please ensure fecal coliforms are reported in CFU/100ml

Analytes

Some common holding times (with correct preservation).  
For further information contact the lab

Eurofins | mgt DI water batch number:

Sample ID	Date	Matrix	B4 (BTEXN / TRH / PAH)	Total Metals (Al, As, Cd, Cr, Cu, Fe, Pb, Hg, Ni, Zn)	pH, Conductivity, Turbidity, Suspended Solids	Ammonia	Sulfide B19A (Nutrients, Total N (TKN, NOX), Total P)	Thermotolerant Coliforms (CFU/100ml)	BOD 5 Day	HOLD
1 SW1		W	X	X	X	X	X	X	X	X
2 SW2		W	X	X	X	X	X	X	X	X
3 SW3		W	X	X	X	X	X	X	X	X
4 SW4		W	X	X	X	X	X	X	X	X
5 SW5		W	X	X	X	X	X	X	X	X
6 SW6		W	X	X	X	X	X	X	X	X
7 SW7		W	X	X	X	X	X	X	X	X
8 SW8		W	X	X	X	X	X	X	X	X
9 SW9		W	X	X	X	X	X	X	X	X
10 SW10		W	X	X	X	X	X	X	X	X
11 SW11		W	X	X	X	X	X	X	X	X
12 SW12		W	X	X	X	X	X	X	X	X
13 Basin 1	27/6/23	W	X	X	X	X	X	X	X	X
14 Basin 2	27/6/23	W	X	X	X	X	X	X	X	X
15 Basin 3	27/6/23	W	X	X	X	X	X	X	X	X
16 RB01	27/6/23	W	X	X			X			
17 RB02	27/6/23	W	X	X						
18 RB02	27/6/23	W	X	X			X			
19										
20										

Waters		Soils	
BTEX, MAH, VOC	14 days	BTEX, MAH, VOC	14 days
TRH, PAH, Phenols, Pesticides	7 days	TRH, PAH, Phenols, Pesticides	14 days
Heavy Metals	6 months	Heavy Metals	6 months
Mercury, CrVI	28 days	Mercury, CrVI	28 days
Microbiological testing	24 hours	Microbiological testing	72 hours
BOD, Nitrate, Nitrite, Total N	2 days	Anions	28 days
Solids - TSS, TDS etc	7 days	SPOCAS, pH Field and FOX, CrS	24 hours
Ferrous iron	7 days	ASLP, TCLP	7 days

Containers:							Sample comments:
1LP	250P	125P	1LA	40mL vial	125mL A	Jar	

Relinquished By: <i>L. Parkinson</i>	Received By: <i>Jaideya Gougeon</i>	Turn around time		Method Of Shipment	Temperature on arrival:
Date & Time: <i>27/6/23</i>	Date & Time: <i>27/6/23 1:30</i>	1 DAY <input type="checkbox"/>	2 DAY <input type="checkbox"/>	<input type="checkbox"/> Courier	<i>10.4</i>
Signature: <i>[Signature]</i>	Signature: <i>[Signature]</i>	5 DAY <input checked="" type="checkbox"/>	10 DAY <input type="checkbox"/>	<input type="checkbox"/> Hand Delivered	Report number:
		Other:		<input type="checkbox"/> Postal	<i>1002645</i>
				Courier Consignment #:	



mgt

**Sydney**  
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**Melbourne**  
 2 Kingston Town Close, Oakleigh, VIC 3156  
 Phone: +613 8564 5000 Fax: +613 8564 5080  
 Email: enquiries.melb@mgtlabmark.com.au

### CHAIN OF CUSTODY RECORD

Page 2 of 2

<b>Company Name :</b> GHD	<b>Contact Name :</b> Lachlan Parkinson	<b>Purchase Order :</b> 12611010	<b>COC Number :</b>
<b>Office Address :</b> L3, 24 Honeysuckle Drive Newcastle 2300	<b>Project Manager :</b> Leslie Maranciak <b>Email for results :</b> <a href="mailto:Leslie.Maranciak@ghd.com">Leslie.Maranciak@ghd.com</a> <a href="mailto:Lachlan.Parkinson@ghd.com">Lachlan.Parkinson@ghd.com</a>	<b>PROJECT Number :</b> 12611010	<b>Eurofins   mgt quote ID :</b> 180501GHD
		<b>PROJECT Name :</b> Aurizon Hexham Water Monitoring	<b>Data output format :</b> ESDAT

**Special Directions & Comments :**

**Please ensure fecal coliforms are reported in CFU/100ml**

Eurofins | mgt OI water batch number:

Sample ID	Date	Matrix	B4 (BTEXN / TRH / PAH)	Dissolved Metals (Al, As, Cd, Cr, Cu, Fe, Pb, Hg, Ni, Zn)	pH, Conductivity, Turbidity, Suspended Solids	Ammonia	Suite B19A (Nutrients, Total N (TKN, NOX), Total P)	Thermotolerant Coliforms (CFU/100ml)	BOD 5 Day	Analytes
1	27/6/23	W	X	X	X	X	X	X	X	Send to ALS - same analysis as FD01 at ALS please
2		W	X	X	X	X	X	X	X	
3		W	X	X	X	X	X	X	X	
4		W	X	X	X	X	X	X	X	
5		W	X	X	X	X	X	X	X	
6		W	X	X	X	X	X	X	X	
7		W	X	X	X	X	X	X	X	
8		W	X	X	X	X	X	X	X	
9		W	X	X	X	X	X	X	X	
10		W	X	X	X	X	X	X	X	
11		W	X	X	X	X	X	X	X	
12		W	X	X			X			
13		W							X	
14										
15										
16										
17										

Some common holding times (with correct preservation). For further information contact the lab

Waters		Soils	
BTEX, MAH, VOC	14 days	BTEX, MAH, VOC	14 days
TRH, PAH, Phenols, Pesticides	7 days	TRH, PAH, Phenols, Pesticides	14 days
Heavy Metals	6 months	Heavy Metals	6 months
Mercury, CrVI	28 days	Mercury, CrVI	28 days
Microbiological testing	24 hours	Microbiological testing	72 hours
BOD, Nitrate, Nitrite, Total N	2 days	Anions	28 days
Solids - TSS, TDS etc	7 days	SPOCAS, pH Field and FOX, CrS	24 hours
Ferrous iron	7 days	ASLP, TCLP	7 days

**Containers:**

1LP	250P	125P	1LA	40mL v.a	125mL A	Jar
-----	------	------	-----	----------	---------	-----

**Sample comments:**

Send to ALS for Same Analysis as FD01

<b>Relinquished By:</b> <i>L Parkinson</i>	<b>Received By:</b>	<b>Laboratory Staff</b>	<b>Turn around time</b>	<b>Method Of Shipment</b>	<b>Temperature on arrival:</b>
<b>Date &amp; Time:</b> 27/6/23	<b>Date &amp; Time:</b> 27/6/23 1:30 PM		1 DAY <input type="checkbox"/> 2 DAY <input type="checkbox"/> 3 DAY <input type="checkbox"/> 5 DAY <input checked="" type="checkbox"/> 10 DAY <input type="checkbox"/> Other:	<input type="checkbox"/> Courier <input type="checkbox"/> Hand Delivered <input type="checkbox"/> Postal	10.4
<b>Signature:</b> <i>[Signature]</i>	<b>Signature:</b> <i>[Signature]</i>			<b>Courier Consignment # :</b>	<b>Report number:</b>

## #AU08\_EnviroSampleNTL

---

**From:** Lachlan Parkinson <lachlan.parkinson@ghd.com>  
**Sent:** Thursday, 29 June 2023 9:52 AM  
**To:** #AU08\_EnviroSampleNTL  
**Cc:** Leslie Maranciak  
**Subject:** RE: Eurofins Sample Receipt Advice - Report 1002645 : Site AURIZON HEXHAM WATER MONITORING (12611010)

**CAUTION: EXTERNAL EMAIL** - Sent from an email domain that is not formally trusted by Eurofins.  
Do not click on links or open attachments unless you recognise the sender and are certain that the content is safe.

Thanks Jaidyn,

Can you please put RB02 on hold?

Kind Regards,

**Lachlan Parkinson**  
B.Env. Sci. & Management  
Environmental Scientist – Contamination Assessment and Remediation

### GHD

GHD - Proudly employee-owned | [ghd.com](https://www.ghd.com)  
Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle, NSW, 2300, Australia  
D +61 2 49107720 E [Lachlan.Parkinson@ghd.com](mailto:Lachlan.Parkinson@ghd.com)

🔗 The Power of Commitment

Connect



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**From:** EnviroSampleNTL@eurofins.com <EnviroSampleNTL@eurofins.com>  
**Sent:** Wednesday, June 28, 2023 4:34 PM  
**To:** Leslie Maranciak <leslie.maranciak@ghd.com>  
**Cc:** Lachlan Parkinson <lachlan.parkinson@ghd.com>  
**Subject:** Eurofins Sample Receipt Advice - Report 1002645 : Site AURIZON HEXHAM WATER MONITORING (12611010)





## CERTIFICATE OF ANALYSIS

Work Order	: <b>ES2321855</b>	Page	: 1 of 6
Client	: <b>GHD PTY LTD</b>	Laboratory	: Environmental Division Sydney
Contact	: Leslie Maranciak	Contact	: Sarah Mathew
Address	: Level 3, GHD Tower, 24 Honeysuckle Drive Newcastle 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: 12611010 Aurizon Hexam Water Monitoring	Date Samples Received	: 30-Jun-2023 13:40
Order number	: ----	Date Analysis Commenced	: 03-Jul-2023
C-O-C number	: ----	Issue Date	: 06-Jul-2023 16:47
Sampler	: ----		
Site	:		
Quote number	: EN/005		
No. of samples received	: 1		
No. of samples analysed	: 1		



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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW



## General Comments

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

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

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

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

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

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

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

- 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)				Sample ID	FD02	----	----	----	----
Sampling date / time				27-Jun-2023 00:00	----	----	----	----	
Compound	CAS Number	LOR	Unit	ES2321855-001	-----	-----	-----	-----	
				Result	---	---	---	---	
<b>EG020F: Dissolved Metals by ICP-MS</b>									
Aluminium	7429-90-5	0.01	mg/L	<0.01	----	----	----	----	
Arsenic	7440-38-2	0.001	mg/L	<b>0.001</b>	----	----	----	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	----	----	----	----	
Chromium	7440-47-3	0.001	mg/L	<0.001	----	----	----	----	
Copper	7440-50-8	0.001	mg/L	<0.001	----	----	----	----	
Nickel	7440-02-0	0.001	mg/L	<b>0.006</b>	----	----	----	----	
Lead	7439-92-1	0.001	mg/L	<0.001	----	----	----	----	
Zinc	7440-66-6	0.005	mg/L	<b>0.134</b>	----	----	----	----	
Iron	7439-89-6	0.05	mg/L	<b>43.9</b>	----	----	----	----	
<b>EG035F: Dissolved Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----	
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	----	----	----	----	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<b>2.8</b>	----	----	----	----	
<b>EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser</b>									
^ Total Nitrogen as N	----	0.1	mg/L	<b>2.8</b>	----	----	----	----	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L	<b>0.42</b>	----	----	----	----	
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons</b>									
Naphthalene	91-20-3	1.0	µg/L	<1.0	----	----	----	----	
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	----	----	----	----	
Acenaphthene	83-32-9	1.0	µg/L	<1.0	----	----	----	----	
Fluorene	86-73-7	1.0	µg/L	<1.0	----	----	----	----	
Phenanthrene	85-01-8	1.0	µg/L	<1.0	----	----	----	----	
Anthracene	120-12-7	1.0	µg/L	<1.0	----	----	----	----	
Fluoranthene	206-44-0	1.0	µg/L	<1.0	----	----	----	----	
Pyrene	129-00-0	1.0	µg/L	<1.0	----	----	----	----	
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	----	----	----	----	
Chrysene	218-01-9	1.0	µg/L	<1.0	----	----	----	----	
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L	<1.0	----	----	----	----	
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	----	----	----	----	
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	----	----	----	----	
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	----	----	----	----	



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	FD02	----	----	----	----
Sampling date / time				27-Jun-2023 00:00	----	----	----	----	
Compound	CAS Number	LOR	Unit	ES2321855-001	-----	-----	-----	-----	
				Result	---	---	---	---	
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued</b>									
Dibenz(a,h)anthracene	53-70-3	1.0	µg/L	<1.0	----	----	----	----	
Benzo(g,h,i)perylene	191-24-2	1.0	µg/L	<1.0	----	----	----	----	
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	----	----	----	----	
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	----	----	----	----	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----	
C10 - C14 Fraction	----	50	µg/L	<50	----	----	----	----	
C15 - C28 Fraction	----	100	µg/L	<100	----	----	----	----	
C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	----	----	----	----	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	----	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----	
>C10 - C16 Fraction	----	100	µg/L	<100	----	----	----	----	
>C16 - C34 Fraction	----	100	µg/L	<100	----	----	----	----	
>C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	----	----	----	----	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	----	----	----	----	
<b>EP080: BTEXN</b>									
Benzene	71-43-2	1	µg/L	<1	----	----	----	----	
Toluene	108-88-3	2	µg/L	<2	----	----	----	----	
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----	
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----	
^ Total Xylenes	----	2	µg/L	<2	----	----	----	----	
^ Sum of BTEX	----	1	µg/L	<1	----	----	----	----	
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----	
<b>EP075(SIM)S: Phenolic Compound Surrogates</b>									
Phenol-d6	13127-88-3	1.0	%	<b>26.2</b>	----	----	----	----	
2-Chlorophenol-D4	93951-73-6	1.0	%	<b>65.3</b>	----	----	----	----	
2,4,6-Tribromophenol	118-79-6	1.0	%	<b>52.4</b>	----	----	----	----	
<b>EP075(SIM)T: PAH Surrogates</b>									



### Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	FD02	----	----	----	----
Sampling date / time				27-Jun-2023 00:00	----	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2321855-001	-----	-----	-----	-----	-----
				Result	---	---	---	---	---
<b>EP075(SIM)T: PAH Surrogates - Continued</b>									
2-Fluorobiphenyl	321-60-8	1.0	%	74.4	----	----	----	----	----
Anthracene-d10	1719-06-8	1.0	%	83.4	----	----	----	----	----
4-Terphenyl-d14	1718-51-0	1.0	%	76.8	----	----	----	----	----
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	2	%	121	----	----	----	----	----
Toluene-D8	2037-26-5	2	%	111	----	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	100	----	----	----	----	----



## Surrogate Control Limits

Sub-Matrix: WATER		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	72	143
Toluene-D8	2037-26-5	75	131
4-Bromofluorobenzene	460-00-4	73	137



## QUALITY CONTROL REPORT

Work Order	: <b>ES2321855</b>	Page	: 1 of 6
Client	: <b>GHD PTY LTD</b>	Laboratory	: Environmental Division Sydney
Contact	: Leslie Maranciak	Contact	: Sarah Mathew
Address	: Level 3, GHD Tower, 24 Honeysuckle Drive Newcastle 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: 12611010 Aurizon Hexam Water Monitoring	Date Samples Received	: 30-Jun-2023
Order number	: ----	Date Analysis Commenced	: 03-Jul-2023
C-O-C number	: ----	Issue Date	: 06-Jul-2023
Sampler	: ----		
Site	:		
Quote number	: EN/005		
No. of samples received	: 1		
No. of samples analysed	: 1		



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



## General Comments

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

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

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

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

## Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
<b>EG020F: Dissolved Metals by ICP-MS (QC Lot: 5149272)</b>									
ES2321963-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	0.0004	0.0004	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.003	0.003	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.052	0.052	0.0	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.077	0.076	1.5	0% - 50%
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.02	0.03	0.0	No Limit
ES2321963-010	Anonymous	EG020A-F: Iron	7439-89-6	0.05	mg/L	1.75	1.75	0.0	0% - 20%
		EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	0.0003	0.0002	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.044	0.045	0.0	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.070	0.067	4.2	0% - 50%
ES2321963-004	Anonymous	EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.02	0.02	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	1.48	1.45	1.7	0% - 20%
<b>EG035F: Dissolved Mercury by FIMS (QC Lot: 5149273)</b>									
ES2321963-004	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2321963-008	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 5149587)</b>									
ES2321687-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.17	0.17	0.0	0% - 50%
ES2321963-004	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.01	0.01	0.0	No Limit



Page : 3 of 6  
 Work Order : ES2321855  
 Client : GHD PTY LTD  
 Project : 12611010 Aurizon Hexam Water Monitoring



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 5149583)</b>									
ES2321687-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.1	1.0	0.0	0% - 50%
ES2321915-024	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.2	0.2	0.0	No Limit
<b>EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 5149582)</b>									
ES2321687-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.08	0.05	37.1	No Limit
ES2321915-024	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.03	0.03	0.0	No Limit
<b>EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5150082)</b>									
ES2321762-002	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES2321762-008	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5150082)</b>									
ES2321762-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES2321762-008	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
<b>EP080: BTEXN (QC Lot: 5150082)</b>									
ES2321762-002	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
ES2321762-008	Anonymous	EP080: Benzene	71-43-2	1	µg/L	4	4	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit



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

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

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
				Result	Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low	High
<b>EG020F: Dissolved Metals by ICP-MS (QCLot: 5149272)</b>								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	87.5	80.0	116
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	88.6	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	86.6	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	87.0	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	87.0	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	86.1	83.0	111
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	86.9	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	91.1	81.0	117
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	86.9	82.0	112
<b>EG035F: Dissolved Mercury by FIMS (QCLot: 5149273)</b>								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	94.1	83.0	105
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5149587)</b>								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	102	91.0	113
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5149583)</b>								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	79.5	69.0	101
				<0.1	1 mg/L	94.3	70.0	118
				<0.1	5 mg/L	94.5	70.0	130
<b>EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5149582)</b>								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	94.9	71.3	126
				<0.01	0.442 mg/L	91.8	71.3	126
				<0.01	1 mg/L	99.8	70.0	130
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 5147625)</b>								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	75.5	50.0	94.0
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	70.3	63.6	114
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	68.9	62.2	113
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	72.6	63.9	115
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	68.2	62.6	116
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	85.2	64.3	116
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	77.3	63.6	118
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	80.6	63.1	118



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
						LCS	Low	High
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 5147625) - continued</b>								
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	74.2	64.1	117
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	81.5	62.5	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	5 µg/L	74.6	61.7	119
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	80.6	63.0	115
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	88.4	63.3	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	80.0	59.9	118
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	83.2	61.2	117
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	74.8	59.1	118
<b>EP080/071: Total Petroleum Hydrocarbons (QCLot: 5147626)</b>								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	80.3	53.7	97.0
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	85.9	63.3	107
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	88.8	58.3	120
<b>EP080/071: Total Petroleum Hydrocarbons (QCLot: 5150082)</b>								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	89.4	75.0	127
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5147626)</b>								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	79.2	53.9	95.5
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	88.8	57.8	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	84.7	50.5	115
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5150082)</b>								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	95.2	75.0	127
<b>EP080: BTEXN (QCLot: 5150082)</b>								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	92.8	68.3	119
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	93.3	73.5	120
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	92.8	73.8	122
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	90.9	73.0	122
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	93.5	76.4	123
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	103	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: **WATER**

Matrix Spike (MS) Report		
Spike	Spike Recovery(%)	Acceptable Limits (%)



Sub-Matrix: **WATER**

				Matrix Spike (MS) Report				
				Spike	SpikeRecovery(%)	Acceptable Limits (%)		
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High	
<b>EG020F: Dissolved Metals by ICP-MS (QCLot: 5149272)</b>								
ES2321963-003	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	112	70.0	130	
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	102	70.0	130	
		EG020A-F: Chromium	7440-47-3	1 mg/L	99.8	70.0	130	
		EG020A-F: Copper	7440-50-8	1 mg/L	98.5	70.0	130	
		EG020A-F: Lead	7439-92-1	1 mg/L	99.5	70.0	130	
		EG020A-F: Nickel	7440-02-0	1 mg/L	102	70.0	130	
		EG020A-F: Zinc	7440-66-6	1 mg/L	104	70.0	130	
<b>EG035F: Dissolved Mercury by FIMS (QCLot: 5149273)</b>								
ES2321963-002	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	72.7	70.0	130	
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5149587)</b>								
ES2321687-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	102	70.0	130	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5149583)</b>								
ES2321687-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	25 mg/L	72.2	70.0	130	
<b>EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5149582)</b>								
ES2321687-002	Anonymous	EK067G: Total Phosphorus as P	----	5 mg/L	88.9	70.0	130	
<b>EP080/071: Total Petroleum Hydrocarbons (QCLot: 5150082)</b>								
ES2321762-002	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	128	70.0	130	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5150082)</b>								
ES2321762-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	127	70.0	130	
<b>EP080: BTEXN (QCLot: 5150082)</b>								
ES2321762-002	Anonymous	EP080: Benzene	71-43-2	25 µg/L	111	70.0	130	
		EP080: Toluene	108-88-3	25 µg/L	110	70.0	130	
		EP080: Ethylbenzene	100-41-4	25 µg/L	112	70.0	130	
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	112	70.0	130	
			106-42-3					
		EP080: ortho-Xylene	95-47-6	25 µg/L	117	70.0	130	
	EP080: Naphthalene	91-20-3	25 µg/L	116	70.0	130		



## QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES2321855	Page	: 1 of 6
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: Leslie Maranciak	Telephone	: +61-2-8784 8555
Project	: 12611010 Aurizon Hexam Water Monitoring	Date Samples Received	: 30-Jun-2023
Site	:	Issue Date	: 06-Jul-2023
Sampler	: ----	No. of samples received	: 1
Order number	: ----	No. of samples analysed	: 1

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

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

### Summary of Outliers

#### Outliers : Quality Control Samples

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

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

#### Outliers : Analysis Holding Time Compliance

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

#### Outliers : Frequency of Quality Control Samples

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



### Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
	0				
<b>Laboratory Duplicates (DUP)</b>					
PAH/Phenols (GC/MS - SIM)	0	3	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	3	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
<b>Matrix Spikes (MS)</b>					
PAH/Phenols (GC/MS - SIM)	0	3	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	3	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

### Analysis Holding Time Compliance

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

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

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

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

Matrix: **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
<b>EG020F: Dissolved Metals by ICP-MS</b>							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F) FD02	27-Jun-2023	----	----	----	04-Jul-2023	24-Dec-2023	✓
<b>EG035F: Dissolved Mercury by FIMS</b>							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F) FD02	27-Jun-2023	----	----	----	05-Jul-2023	25-Jul-2023	✓
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>							
Clear Plastic Bottle - Sulfuric Acid (EK059G) FD02	27-Jun-2023	----	----	----	04-Jul-2023	25-Jul-2023	✓
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>							
Clear Plastic Bottle - Sulfuric Acid (EK061G) FD02	27-Jun-2023	04-Jul-2023	25-Jul-2023	✓	05-Jul-2023	25-Jul-2023	✓
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>							
Clear Plastic Bottle - Sulfuric Acid (EK067G) FD02	27-Jun-2023	04-Jul-2023	25-Jul-2023	✓	05-Jul-2023	25-Jul-2023	✓
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons</b>							
Amber Glass Bottle - Unpreserved (EP075(SIM)) FD02	27-Jun-2023	04-Jul-2023	04-Jul-2023	✓	06-Jul-2023	13-Aug-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
<b>EP080/071: Total Petroleum Hydrocarbons</b>							
Amber Glass Bottle - Unpreserved (EP071) FD02	27-Jun-2023	04-Jul-2023	04-Jul-2023	✓	06-Jul-2023	13-Aug-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) FD02	27-Jun-2023	05-Jul-2023	11-Jul-2023	✓	06-Jul-2023	11-Jul-2023	✓
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>							
Amber Glass Bottle - Unpreserved (EP071) FD02	27-Jun-2023	04-Jul-2023	04-Jul-2023	✓	06-Jul-2023	13-Aug-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) FD02	27-Jun-2023	05-Jul-2023	11-Jul-2023	✓	06-Jul-2023	11-Jul-2023	✓
<b>EP080: BTEXN</b>							
Amber VOC Vial - Sulfuric Acid (EP080) FD02	27-Jun-2023	05-Jul-2023	11-Jul-2023	✓	06-Jul-2023	11-Jul-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: **WATER** Evaluation: ✘ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
<b>Laboratory Duplicates (DUP)</b>							
Dissolved Mercury by FIMS	EG035F	2	12	16.67	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	12	16.67	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	3	0.00	10.00	✘	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	3	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
<b>Laboratory Control Samples (LCS)</b>							
Dissolved Mercury by FIMS	EG035F	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	3	33.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	20	15.00	15.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	3	20	15.00	15.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	3	33.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
<b>Method Blanks (MB)</b>							
Dissolved Mercury by FIMS	EG035F	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	3	33.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	3	33.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
<b>Matrix Spikes (MS)</b>							
Dissolved Mercury by FIMS	EG035F	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	3	0.00	5.00	✘	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	3	0.00	5.00	✘	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard





## Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl <sub>2</sub> )(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl <sub>2</sub> 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).
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO <sub>3</sub> - F. Combined oxidised Nitrogen (NO <sub>2</sub> +NO <sub>3</sub> ) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO <sub>3</sub> -. This method is compliant with NEPM Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al, Zhang et al. This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015 The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270 Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260 Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM Schedule B(3)
Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)

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Work Order : ES2321855  
Client : GHD PTY LTD  
Project : 12611010 Aurizon Hexam Water Monitoring



<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for purging.

**CHAIN OF CUSTODY RECORD**

CLIENT DETAILS

Company Name : <b>GHD</b>	Contact Name : <b>Lachlan Parkinson</b>	Purchase Order : <b>12611010</b>	COC Number :
Office Address : <b>L3, 24 Honeysuckle Drive</b>	Project Manager : <b>Leslie Maranciak</b>	PROJECT Number : <b>12611010</b>	Eurofins   mgt quote ID : <b>180501GHD</b>
<b>Newcastle 2300</b>	Email for results : <b>Leslie.Maranciak@ghd.com</b> <b>Lachlan.Parkinson@ghd.com</b>	PROJECT Name : <b>Aurizon Hexham Water Monitoring</b>	Data output format : <b>ESDAT</b>

Special Directions & Comments : **Please ensure fecal coliforms are reported in CFU/100ml**

Sample ID	Date	Matrix	Analytes										Containers:		Sample comments:				
			B4 (BTEXN / TRH / PAH)	Dissolved Metals (Al, As, Cd, Cr, Cu, Fe, Pb, Hg, Ni, Zn)	pH, Conductivity, Turbidity, Suspended Solids	Ammonia	Sulfide (BIS4) (Inorganic, Total N (TRN, NOX), Total P)	Thermotolerant Coliforms (CFU/100ml)	BOD 5 Day	Send to ALS - same analysis as FD01 at ALS please	1LP	250P	125P	1LA		40mL vial	125mL A	J&F	
1	27/6/23	W	X	X	X	X	X	X	X	X	X	X	X						
2		W	X	X	X	X	X	X	X	X	X	X	X						
3		W	X	X	X	X	X	X	X	X	X	X	X						
4		W	X	X	X	X	X	X	X	X	X	X	X						
5		W	X	X	X	X	X	X	X	X	X	X	X						
6		W	X	X	X	X	X	X	X	X	X	X	X						
7		W	X	X	X	X	X	X	X	X	X	X	X						
8		W	X	X	X	X	X	X	X	X	X	X	X						
9		W	X	X	X	X	X	X	X	X	X	X	X						
10		W	X	X	X	X	X	X	X	X	X	X	X						
11		W	X	X	X	X	X	X	X	X	X	X	X						
12		W	X	X															
13		W	X	X															Send to ALS for Same Analysis as FD01
14																			
15																			
16																			
17																			

Environmental Division  
Sydney  
Work Order Reference  
**ES2321855**



Telephone : + 61-2-8794 8555

Relinquished By: <i>L Parkinson</i>	Received By:	Turn around time	Method Of Shipment	Temperature on arrival:
Date & Time: <i>27/6/23</i>	Date & Time: <i>27/6/23 1:30 PM</i>	1 DAY <input type="checkbox"/> 2 DAY <input type="checkbox"/> 3 DAY <input type="checkbox"/>	<input type="checkbox"/> Courier <input type="checkbox"/> Hand Delivered <input type="checkbox"/> Postal	<i>10.4</i>
Signature: <i>[Signature]</i>	Signature: <i>[Signature]</i>	5 DAY <input checked="" type="checkbox"/> NO DAY <input type="checkbox"/> Other:	Courier Consignment # :	Report number:

rec: Fax *[Signature]* 26/6/23 1:40p

Re: Eurofins - Report 1002503 : Site STONEY CHUTE RD (218033)

Bonnie Pu

Thu 2023-06-29 4:03 PM

To: #AU25\_Enviro\_Sample\_NSW <EnviroSampleNSW@eurofins.com>

**INFO:** INTERNAL EMAIL - Sent from your own Eurofins email domain.

Hi Elizabeth and Lisa,

Has this been actioned yet? Sample 23-Jn0060516 of report 1002503 for ALS

Kind Regards,

**Bonnie Pu**

Analytical Services Manager

My hours are 10 am - 6 pm

Eurofins Environment Testing Australia Pty Ltd

179 Magowar Road

Girraween, NSW, 2145

Email: [BonniePu@eurofins.com](mailto:BonniePu@eurofins.com)

Phone: 0429 195 949

Website: [www.eurofins.com.au/environmental-testing](http://www.eurofins.com.au/environmental-testing)

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---

**From:** Bonnie Pu <[BonniePu@eurofins.com](mailto:BonniePu@eurofins.com)>

**Sent:** Tuesday, June 27, 2023 1:28 PM

**To:** #AU25\_Enviro\_Sample\_NSW <[EnviroSampleNSW@eurofins.com](mailto:EnviroSampleNSW@eurofins.com)>

**Subject:** Re: Eurofins - Report 1002503 : Site STONEY CHUTE RD (218033)

Hi Elizabeth,

Could you please pull out the sample and send it to ALS with a copy of this email the COC? I've already cancelled the analysis on the sample so if you could just resend the SRA with the SRA note I've added that would be great

Kind Regards,

**Bonnie Pu**

Analytical Services Manager

My hours are 10 am - 6 pm

Eurofins Environment Testing Australia Pty Ltd

179 Magowar Road

Girraween, NSW, 2145

Email: [BonniePu@eurofins.com](mailto:BonniePu@eurofins.com)

Phone: 0429 195 949

Website: [www.eurofins.com.au/environmental-testing](http://www.eurofins.com.au/environmental-testing)

GHD Pty Ltd  
3/24 Honeysuckle Dve  
Newcastle  
NSW 2300



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Site Number 18217

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

Attention: Lachlan Parkinson

Report 1029317-W-V3  
Project name Aurizon Hexham water Monitoring  
Project ID 12611010  
Received Date Sep 26, 2023

Client Sample ID			Basin 1	RB01	MW01R	101R
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N23- Se0060071	N23- Se0060072	N23- Se0060074	N23- Se0060075
Date Sampled			Sep 26, 2023	Sep 26, 2023	Sep 26, 2023	Sep 26, 2023
Test/Reference	LOR	Unit				
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
<b>BTEX</b>						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	91	94	94	91
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>						
Naphthalene <sup>N02</sup>	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH >C10-C16 less Naphthalene (F2) <sup>N01</sup>	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1) <sup>N04</sup>	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
<b>Polycyclic Aromatic Hydrocarbons</b>						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene <sup>N07</sup>	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1,2,3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001

Client Sample ID			Basin 1	RB01	MW01R	101R
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N23- Se0060071	N23- Se0060072	N23- Se0060074	N23- Se0060075
Date Sampled			Sep 26, 2023	Sep 26, 2023	Sep 26, 2023	Sep 26, 2023
Test/Reference	LOR	Unit				
<b>Polycyclic Aromatic Hydrocarbons</b>						
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	<sup>Q09</sup> INT	72	64	59
p-Terphenyl-d14 (surr.)	1	%	51	109	99	94
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>						
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
<b>Ammonia (as N)</b>						
Ammonia (as N)	0.01	mg/L	0.23	-	1.2	4.5
<b>Biochemical Oxygen Demand (BOD-5 Day)</b>						
Biochemical Oxygen Demand (BOD-5 Day)	2	mg/L	< 50	-	< 50	< 50
<b>Conductivity (at 25 °C)</b>						
Conductivity (at 25 °C)	10	uS/cm	1300	-	6200	9300
<b>Nitrate &amp; Nitrite (as N)</b>						
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
<b>Nitrate (as N)</b>						
Nitrate (as N)	0.02	mg/L	0.03	0.02	< 0.02	< 0.02
<b>Nitrite (as N)</b>						
Nitrite (as N)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
<b>pH (at 25 °C)</b>						
pH (at 25 °C)	0.1	pH Units	7.9	-	6.3	6.9
<b>Total Kjeldahl Nitrogen (as N)</b>						
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	0.9	< 0.2	1.4	4.6
<b>Total Nitrogen (as N)*</b>						
Total Nitrogen (as N)*	0.2	mg/L	0.9	< 0.2	1.4	4.6
<b>Total Suspended Solids Dried at 103 °C to 105 °C</b>						
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	9.5	-	32	65
<b>Turbidity</b>						
Turbidity	1	NTU	3.8	-	390	520
<b>Phosphate total (as P)</b>						
Phosphate total (as P)	0.01	mg/L	0.70	< 0.01	0.16	0.08
<b>Thermotolerant Coliforms</b>						
Thermotolerant Coliforms	1	CFU/100mL	91	-	< 1	< 1
<b>Heavy Metals</b>						
<b>Aluminium</b>						
Aluminium	0.05	mg/L	< 0.05	< 0.05	-	-
<b>Aluminium (filtered)</b>						
Aluminium (filtered)	0.05	mg/L	-	-	0.05	< 0.05
<b>Arsenic</b>						
Arsenic	0.001	mg/L	0.002	< 0.001	-	-
<b>Arsenic (filtered)</b>						
Arsenic (filtered)	0.001	mg/L	-	-	0.002	0.004
<b>Cadmium</b>						
Cadmium	0.0002	mg/L	< 0.0002	< 0.0002	-	-
<b>Cadmium (filtered)</b>						
Cadmium (filtered)	0.0002	mg/L	-	-	< 0.0002	< 0.0002
<b>Chromium</b>						
Chromium	0.001	mg/L	< 0.001	< 0.001	-	-
<b>Chromium (filtered)</b>						
Chromium (filtered)	0.001	mg/L	-	-	< 0.001	< 0.001
<b>Copper</b>						
Copper	0.001	mg/L	< 0.001	< 0.001	-	-
<b>Copper (filtered)</b>						
Copper (filtered)	0.001	mg/L	-	-	< 0.001	< 0.001
<b>Iron</b>						
Iron	0.05	mg/L	0.09	0.09	-	-
<b>Iron (filtered)</b>						
Iron (filtered)	0.05	mg/L	-	-	110	35
<b>Lead</b>						
Lead	0.001	mg/L	< 0.001	< 0.001	-	-
<b>Lead (filtered)</b>						
Lead (filtered)	0.001	mg/L	-	-	< 0.001	< 0.001
<b>Mercury</b>						
Mercury	0.0001	mg/L	< 0.0001	< 0.0001	-	-
<b>Mercury (filtered)</b>						
Mercury (filtered)	0.0001	mg/L	-	-	< 0.0001	< 0.0001
<b>Nickel</b>						
Nickel	0.001	mg/L	< 0.001	< 0.001	-	-
<b>Nickel (filtered)</b>						
Nickel (filtered)	0.001	mg/L	-	-	0.047	0.007
<b>Zinc</b>						
Zinc	0.005	mg/L	< 0.005	< 0.005	-	-
<b>Zinc (filtered)</b>						
Zinc (filtered)	0.005	mg/L	-	-	0.015	0.008

Client Sample ID			MW101R	MW106R	MW108R	MW301R
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N23- Se0060076	N23- Se0060077	N23- Se0060078	N23- Se0060079
Date Sampled			Sep 26, 2023	Sep 26, 2023	Sep 26, 2023	Sep 26, 2023
Test/Reference	LOR	Unit				
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
<b>BTEX</b>						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	93	95	93	95
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>						
Naphthalene <sup>N02</sup>	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH >C10-C16 less Naphthalene (F2) <sup>N01</sup>	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1) <sup>N04</sup>	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
<b>Polycyclic Aromatic Hydrocarbons</b>						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene <sup>N07</sup>	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1,2,3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	65	59	63	<sup>Q09</sup> INT
p-Terphenyl-d14 (surr.)	1	%	93	91	94	102
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>						
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
<b>Ammonia (as N)</b>						
Ammonia (as N)	0.01	mg/L	1.3	0.10	0.13	2.6
<b>Biochemical Oxygen Demand (BOD-5 Day)</b>						
Biochemical Oxygen Demand (BOD-5 Day)	2	mg/L	49	< 50	< 50	< 50
<b>Conductivity (at 25 °C)</b>						
Conductivity (at 25 °C)	10	uS/cm	31000	670	3600	15000
<b>Nitrate &amp; Nitrite (as N)</b>						
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05

Client Sample ID			MW101R	MW106R	MW108R	MW301R
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N23- Se0060076	N23- Se0060077	N23- Se0060078	N23- Se0060079
Date Sampled			Sep 26, 2023	Sep 26, 2023	Sep 26, 2023	Sep 26, 2023
Test/Reference	LOR	Unit				
Nitrate (as N)	0.02	mg/L	< 0.02	0.05	0.02	< 0.02
Nitrite (as N)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
pH (at 25 °C)	0.1	pH Units	7.3	7.5	7.0	7.1
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	3.1	15	< 0.2	3.2
Total Nitrogen (as N)*	0.2	mg/L	3.1	15	< 0.2	3.2
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	12000	30	18	61
Turbidity	1	NTU	1800	20	34	240
Phosphate total (as P)	0.01	mg/L	3.2	0.12	0.06	1.6
Thermotolerant Coliforms	1	CFU/100mL	< 1	< 1	< 1	< 1
<b>Heavy Metals</b>						
Aluminium (filtered)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Arsenic (filtered)	0.001	mg/L	0.004	0.001	< 0.001	0.001
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001	0.001	< 0.001	< 0.001
Iron (filtered)	0.05	mg/L	9.1	0.15	2.6	9.0
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	0.028	0.002	0.006	0.002
Zinc (filtered)	0.005	mg/L	0.015	0.010	0.018	< 0.005

Client Sample ID			MW02	MW307R	MW308R	FD01
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N23- Se0060080	N23- Se0060081	N23- Se0060082	N23- Se0060083
Date Sampled			Sep 26, 2023	Sep 26, 2023	Sep 26, 2023	Sep 26, 2023
Test/Reference	LOR	Unit				
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	0.14
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	0.14
<b>BTEX</b>						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	88	92	90	91
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>						
Naphthalene <sup>N02</sup>	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH >C10-C16 less Naphthalene (F2) <sup>N01</sup>	0.05	mg/L	< 0.05	< 0.05	< 0.05	0.11
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1) <sup>N04</sup>	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02



Client Sample ID			MW02	MW307R	MW308R	FD01
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N23- Se0060080	N23- Se0060081	N23- Se0060082	N23- Se0060083
Date Sampled			Sep 26, 2023	Sep 26, 2023	Sep 26, 2023	Sep 26, 2023
Test/Reference	LOR	Unit				
<b>Polycyclic Aromatic Hydrocarbons</b>						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene <sup>N07</sup>	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	<sup>Q09</sup> INT	<sup>Q09</sup> INT	<sup>Q09</sup> INT	56
p-Terphenyl-d14 (surr.)	1	%	105	106	119	118
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>						
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	0.11
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	0.11
<b>Ammonia (as N)</b>						
Ammonia (as N)	0.01	mg/L	1.7	29	2.2	-
<b>Biochemical Oxygen Demand (BOD-5 Day)</b>						
Biochemical Oxygen Demand (BOD-5 Day)	2	mg/L	< 50	< 50	< 50	-
<b>Conductivity (at 25 °C)</b>						
Conductivity (at 25 °C)	10	uS/cm	2000	38000	3900	-
<b>Nitrate &amp; Nitrite (as N)</b>						
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05	< 0.05	0.12	0.06
<b>Nitrate (as N)</b>						
Nitrate (as N)	0.02	mg/L	< 0.02	< 0.02	0.12	0.06
<b>Nitrite (as N)</b>						
Nitrite (as N)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
<b>pH (at 25 °C)</b>						
pH (at 25 °C)	0.1	pH Units	5.8	7.7	6.8	-
<b>Total Kjeldahl Nitrogen (as N)</b>						
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	1.6	28	2.5	0.9
<b>Total Nitrogen (as N)*</b>						
Total Nitrogen (as N)*	0.2	mg/L	1.6	28	2.6	1.0
<b>Total Suspended Solids Dried at 103 °C to 105 °C</b>						
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	23	28	34	-
<b>Turbidity</b>						
Turbidity	1	NTU	31	12	330	-
<b>Phosphate total (as P)</b>						
Phosphate total (as P)	0.01	mg/L	0.77	9.4	0.27	0.17
<b>Thermotolerant Coliforms</b>						
Thermotolerant Coliforms	1	CFU/100mL	< 1	< 1	14	-
<b>Heavy Metals</b>						
<b>Aluminium (filtered)</b>						
Aluminium (filtered)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
<b>Arsenic (filtered)</b>						
Arsenic (filtered)	0.001	mg/L	0.017	< 0.001	0.005	0.002
<b>Cadmium (filtered)</b>						
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
<b>Chromium (filtered)</b>						
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
<b>Copper (filtered)</b>						
Copper (filtered)	0.001	mg/L	0.001	< 0.001	< 0.001	< 0.001
<b>Iron (filtered)</b>						
Iron (filtered)	0.05	mg/L	79	0.12	42	110
<b>Lead (filtered)</b>						
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
<b>Mercury (filtered)</b>						
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
<b>Nickel (filtered)</b>						
Nickel (filtered)	0.001	mg/L	0.057	< 0.001	0.001	0.046
<b>Zinc (filtered)</b>						
Zinc (filtered)	0.005	mg/L	0.086	< 0.005	< 0.005	0.015

<b>Client Sample ID</b>			<b>MW302R</b>
<b>Sample Matrix</b>			<b>Water</b>
<b>Eurofins Sample No.</b>			<b>N23- Se0062013</b>
<b>Date Sampled</b>			<b>Sep 26, 2023</b>
Test/Reference	LOR	Unit	
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>			
TRH C6-C9	0.02	mg/L	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1
<b>BTEX</b>			
Benzene	0.001	mg/L	< 0.001
Toluene	0.001	mg/L	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002
o-Xylene	0.001	mg/L	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003
4-Bromofluorobenzene (surr.)	1	%	93
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>			
Naphthalene <sup>N02</sup>	0.01	mg/L	< 0.01
TRH >C10-C16 less Naphthalene (F2) <sup>N01</sup>	0.05	mg/L	< 0.05
TRH C6-C10	0.02	mg/L	< 0.02
TRH C6-C10 less BTEX (F1) <sup>N04</sup>	0.02	mg/L	< 0.02
<b>Polycyclic Aromatic Hydrocarbons</b>			
Acenaphthene	0.001	mg/L	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001
Anthracene	0.001	mg/L	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001
Benzo(b&j)fluoranthene <sup>N07</sup>	0.001	mg/L	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001
Chrysene	0.001	mg/L	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001
Fluoranthene	0.001	mg/L	< 0.001
Fluorene	0.001	mg/L	< 0.001
Indeno(1,2,3-cd)pyrene	0.001	mg/L	< 0.001
Naphthalene	0.001	mg/L	< 0.001
Phenanthrene	0.001	mg/L	< 0.001
Pyrene	0.001	mg/L	< 0.001
Total PAH*	0.001	mg/L	< 0.001
2-Fluorobiphenyl (surr.)	1	%	53
p-Terphenyl-d14 (surr.)	1	%	101
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>			
TRH >C10-C16	0.05	mg/L	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1
<b>Ammonia (as N)</b>			
Ammonia (as N)	0.01	mg/L	1.3
<b>Biochemical Oxygen Demand (BOD-5 Day)</b>			
Biochemical Oxygen Demand (BOD-5 Day)	2	mg/L	< 50
<b>Conductivity (at 25 °C)</b>			
Conductivity (at 25 °C)	10	uS/cm	4200
<b>Nitrate &amp; Nitrite (as N)</b>			
Nitrate & Nitrite (as N)	0.05	mg/L	0.06

<b>Client Sample ID</b>			<b>MW302R</b>
<b>Sample Matrix</b>			<b>Water</b>
<b>Eurofins Sample No.</b>			<b>N23- Se0062013</b>
<b>Date Sampled</b>			<b>Sep 26, 2023</b>
Test/Reference	LOR	Unit	
<b>Nitrate (as N)</b>			
	0.02	mg/L	0.06
<b>Nitrite (as N)</b>			
	0.02	mg/L	< 0.02
<b>pH (at 25 °C)</b>			
	0.1	pH Units	6.3
<b>Total Kjeldahl Nitrogen (as N)</b>			
	0.2	mg/L	3.2
<b>Total Nitrogen (as N)*</b>			
	0.2	mg/L	3.3
<b>Total Suspended Solids Dried at 103 °C to 105 °C</b>			
	5	mg/L	42
<b>Turbidity</b>			
	1	NTU	500
<b>Phosphate total (as P)</b>			
	0.01	mg/L	0.64
<b>Thermotolerant Coliforms</b>			
	1	CFU/100mL	< 1
<b>Heavy Metals</b>			
<b>Aluminium (filtered)</b>			
	0.05	mg/L	< 0.05
<b>Arsenic (filtered)</b>			
	0.001	mg/L	0.002
<b>Cadmium (filtered)</b>			
	0.0002	mg/L	< 0.0002
<b>Chromium (filtered)</b>			
	0.001	mg/L	< 0.001
<b>Copper (filtered)</b>			
	0.001	mg/L	< 0.001
<b>Iron (filtered)</b>			
	0.05	mg/L	97
<b>Lead (filtered)</b>			
	0.001	mg/L	< 0.001
<b>Mercury (filtered)</b>			
	0.0001	mg/L	< 0.0001
<b>Nickel (filtered)</b>			
	0.001	mg/L	0.010
<b>Zinc (filtered)</b>			
	0.005	mg/L	0.088

**Sample History**

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

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

Description	Testing Site	Extracted	Holding Time
<b>Eurofins Suite B4</b>			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Oct 18, 2023	7 Days
BTEX - Method: LTM-ORG-2010 BTEX and Volatile TRH	Sydney	Sep 29, 2023	14 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Sep 29, 2023	7 Days
Polycyclic Aromatic Hydrocarbons - Method: LTM-ORG-2130 PAH and Phenols in Soil and Water	Sydney	Sep 29, 2023	7 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Oct 18, 2023	7 Days
Ammonia (as N) - Method: LTM-INO-4200 Ammonia by Discrete Analyser	Sydney	Sep 29, 2023	28 Days
Biochemical Oxygen Demand (BOD-5 Day) - Method: LTM-INO-4010 Biochemical Oxygen Demand (BOD5) in Water	Sydney	Sep 29, 2023	2 Days
Conductivity (at 25 °C) - Method: LTM-INO-4030 Conductivity	Newcastle	Sep 27, 2023	28 Days
pH (at 25 °C) - Method: LTM-GEN-7090 pH by ISE	Newcastle	Sep 27, 2023	0 Day
Total Suspended Solids Dried at 103 °C to 105 °C - Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry	Newcastle	Sep 27, 2023	7 Days
Turbidity - Method: LTM-INO-4140 Turbidity by Nephelometric Method	Sydney	Sep 29, 2023	2 Days
Phosphate total (as P) - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Melbourne	Oct 04, 2023	28 Days
Thermotolerant Coliforms - Method: AS 4276.5 (in-house method LTM-MIC-6010)	Newcastle	Sep 27, 2023	24 Hours
Heavy Metals - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Sep 29, 2023	28 Days
Heavy Metals (filtered) - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Sep 29, 2023	180 Days
Metals M8 - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Sep 26, 2023	28 Days
Metals M8 filtered - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Sep 29, 2023	28 Days
<b>Total Nitrogen Set (as N)</b>			
Nitrate & Nitrite (as N) - Method: LTM-INO-4450 Determination of Nitrogen Species by Discrete Analyser	Melbourne	Oct 02, 2023	28 Days
Nitrate (as N) - Method: LTM-INO-4450 Determination of Nitrogen Species by Discrete Analyser	Melbourne	Oct 02, 2023	28 Days
Nitrite (as N) - Method: LTM-INO-4450 Determination of Nitrogen Species by Discrete Analyser	Melbourne	Oct 02, 2023	2 Days
Total Kjeldahl Nitrogen (as N) - Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA	Melbourne	Oct 02, 2023	28 Days

**Eurofins Environment Testing Australia Pty Ltd**

ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road Dandenong South VIC 3175 Tel: +61 3 8564 5000 NATA# 1261 Site# 1254	19/8 Lewalan Street Grovedale VIC 3216 Tel: +61 3 8564 5000 NATA# 1261 Site# 25403	179 Magowar Road Girraween NSW 2145 Tel: +61 2 9900 8400 NATA# 1261 Site# 18217	Unit 1,2 Dacre Street Mitchell ACT 2911 Tel: +61 2 6113 8091 NATA# 1261 Site# 25466	1/21 Smallwood Place Murarrie QLD 4172 Tel: +61 7 3902 4600 NATA# 1261 Site# 20794	1/2 Frost Drive Mayfield West NSW 2304 Tel: +61 2 4968 8448 NATA# 1261 Site# 25079 & 25289

**Eurofins ARL Pty Ltd**

ABN: 91 05 0159 898

Perth
46-48 Banksia Road Welshpool WA 6106 Tel: +61 8 6253 4444 NATA# 2377 Site# 2370

**Eurofins Environment Testing NZ Ltd**

NZBN: 9429046024954

Auckland	Christchurch	Tauranga
35 O'Rorke Road Penrose, Auckland 1061 Tel: +64 9 526 4551 IANZ# 1327	43 Detroit Drive Rolleston, Christchurch 7675 Tel: +64 3 343 5201 IANZ# 1290	1277 Cameron Road, Gate Pa, Tauranga 3112 Tel: +64 9 525 0568 IANZ# 1402

## Sample Receipt Advice

<b>Company name:</b>	GHD Pty Ltd NEWCASTLE
<b>Contact name:</b>	Lachlan Parkinson
<b>Project name:</b>	Aurizon Hexham water Monitoring
<b>Project ID:</b>	12611010
<b>Turnaround time:</b>	5 Day
<b>Date/Time received</b>	Sep 26, 2023 2:00 PM
<b>Eurofins reference</b>	1029317

## Sample Information

- ✓ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ✓ Sample Temperature of chilled sample on the batch as recorded by Eurofins Sample Receipt : 14.3 degrees Celsius.
- ✓ All samples have been received as described on the above COC.
- ✓ COC has been completed correctly.
- ✓ Attempt to chill was evident.
- ✓ Appropriately preserved sample containers have been used.
- ✓ All samples were received in good condition.
- ✓ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ✓ Appropriate sample containers have been used.
- ✓ Sample containers for volatile analysis received with zero headspace.
- ✓ Split sample sent to requested external lab.
- ✗ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

## Notes

Extra sample MW01R\_2 logged on hold. FDO@ forwarded to ALS

## Contact

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

**Andrew Black on phone : (+61) 2 9900 8490 or by email: AndrewBlack@eurofins.com**

Results will be delivered electronically via email to Lachlan Parkinson - lachlan.parkinson@ghd.com.

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

<b>Melbourne</b> 6 Monterey Road Dandenong South VIC 3175 Tel: +61 3 8564 5000 NATA# 1261 Site# 1254	<b>Geelong</b> 19/8 Lewalan Street Grovedale VIC 3216 Tel: +61 3 8564 5000 NATA# 1261 Site# 25403	<b>Sydney</b> 179 Magowar Road Girraween NSW 2145 Tel: +61 2 9900 8400 NATA# 1261 Site# 18217	<b>Canberra</b> Unit 1,2 Dacre Street Mitchell ACT 2911 Tel: +61 2 6113 8091 NATA# 1261 Site# 25466	<b>Brisbane</b> 1/21 Smallwood Place Murarrie QLD 4172 Tel: +61 7 3902 4600 NATA# 1261 Site# 20794	<b>Newcastle</b> 1/2 Frost Drive Mayfield West NSW 2304 Tel: +61 2 4968 8448 NATA# 1261 Site# 25079 & 25289
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<b>Perth</b> 46-48 Banksia Road Welshpool WA 6106 Tel: +61 8 6253 4444 NATA# 2377 Site# 2370
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<b>Auckland</b> 35 O'Rorke Road Penrose, Auckland 1061 Tel: +64 9 526 4551 IANZ# 1327	<b>Christchurch</b> 43 Detroit Drive Rolleston, Christchurch 7675 Tel: +64 3 343 5201 IANZ# 1290	<b>Tauranga</b> 1277 Cameron Road, Gate Pa, Tauranga 3112 Tel: +64 9 525 0568 IANZ# 1402
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<b>Company Name:</b>	GHD Pty Ltd NEWCASTLE	<b>Order No.:</b>		<b>Received:</b>	Sep 26, 2023 2:00 PM
<b>Address:</b>	3/24 Honeysuckle Dve Newcastle NSW 2300	<b>Report #:</b>	1029317	<b>Due:</b>	Oct 3, 2023
		<b>Phone:</b>	02 4979 9999	<b>Priority:</b>	5 Day
		<b>Fax:</b>	02 4979 9988	<b>Contact Name:</b>	Lachlan Parkinson
<b>Project Name:</b>	Aurizon Hexham water Monitoring				
<b>Project ID:</b>	12611010				

**Eurofins Analytical Services Manager : Andrew Black**

Sample Detail						Aluminium	Aluminium (filtered)	Ammonia (as N)	Biochemical Oxygen Demand (BOD-5 Day)	Conductivity (at 25 °C)	HOLD	Iron	Iron (filtered)	pH (at 25 °C)	Phosphate total (as P)	Thermotolerant Coliforms	Total Suspended Solids Dried at 103 °C to 105 °C	Turbidity	Metals M8	Metals M8 filtered	Eurofins Suite B4	Eurofins Suite B19A: Total N (TKN, NO <sub>x</sub> ), Total P
<b>Melbourne Laboratory - NATA # 1261 Site # 1254</b>															X				X	X	X	X
<b>Sydney Laboratory - NATA # 1261 Site # 18217</b>						X	X	X	X		X	X	X					X	X	X	X	
<b>Mayfield Laboratory - NATA # 1261 Site # 25079 &amp; 25289</b>										X				X		X						
<b>External Laboratory</b>																						
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID																	
1	Basin 1	Sep 26, 2023		Water	N23-Se0060071	X		X	X	X		X		X	X	X	X	X	X		X	X
2	RB01	Sep 26, 2023		Water	N23-Se0060072	X						X			X				X		X	X
3	FB01	Sep 26, 2023		Water	N23-Se0060073						X											
4	MW01R	Sep 26, 2023		Water	N23-Se0060074		X	X	X	X			X	X	X	X	X	X		X	X	X
5	101R	Sep 26, 2023		Water	N23-Se0060075		X	X	X	X			X	X	X	X	X	X		X	X	X
6	MW101R	Sep 26, 2023		Water	N23-Se0060076		X	X	X	X			X	X	X	X	X	X		X	X	X
7	MW106R	Sep 26, 2023		Water	N23-Se0060077		X	X	X	X			X	X	X	X	X	X		X	X	X
8	MW108R	Sep 26, 2023		Water	N23-Se0060078		X	X	X	X			X	X	X	X	X	X		X	X	X
9	MW301R	Sep 26, 2023		Water	N23-Se0060079		X	X	X	X			X	X	X	X	X	X		X	X	X
10	MW02	Sep 26, 2023		Water	N23-Se0060080		X	X	X	X			X	X	X	X	X	X		X	X	X
11	MW307R	Sep 26, 2023		Water	N23-Se0060081		X	X	X	X			X	X	X	X	X	X		X	X	X

web: www.eurofins.com.au  
 email: EnviroSales@eurofins.com

<b>Melbourne</b> 6 Monterey Road Dandenong South VIC 3175 Tel: +61 3 8564 5000 NATA# 1261 Site# 1254	<b>Geelong</b> 19/8 Lewalan Street Grovedale VIC 3216 Tel: +61 3 8564 5000 NATA# 1261 Site# 25403	<b>Sydney</b> 179 Magowar Road Girraween NSW 2145 Tel: +61 2 9900 8400 NATA# 1261 Site# 18217	<b>Canberra</b> Unit 1,2 Dacre Street Mitchell ACT 2911 Tel: +61 2 6113 8091 NATA# 1261 Site# 25466	<b>Brisbane</b> 1/21 Smallwood Place Murarrie QLD 4172 Tel: +61 7 3902 4600 NATA# 1261 Site# 20794	<b>Newcastle</b> 1/2 Frost Drive Mayfield West NSW 2304 Tel: +61 2 4968 8448 NATA# 1261 Site# 25079 & 25289
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<b>Company Name:</b> GHD Pty Ltd NEWCASTLE	<b>Order No.:</b>	<b>Received:</b> Sep 26, 2023 2:00 PM
<b>Address:</b> 3/24 Honeysuckle Dve Newcastle NSW 2300	<b>Report #:</b> 1029317	<b>Due:</b> Oct 3, 2023
	<b>Phone:</b> 02 4979 9999	<b>Priority:</b> 5 Day
	<b>Fax:</b> 02 4979 9988	<b>Contact Name:</b> Lachlan Parkinson
<b>Project Name:</b> Aurizon Hexham water Monitoring	<b>Eurofins Analytical Services Manager : Andrew Black</b>	
<b>Project ID:</b> 12611010		

Sample Detail					Aluminium	Aluminium (filtered)	Ammonia (as N)	Biochemical Oxygen Demand (BOD-5 Day)	Conductivity (at 25 °C)	HOLD	Iron	Iron (filtered)	pH (at 25 °C)	Phosphate total (as P)	Thermotolerant Coliforms	Total Suspended Solids Dried at 103 °C to 105 °C	Turbidity	Metals M8	Metals M8 filtered	Eurofins Suite B4	Eurofins Suite B19A: Total N (TKN, NO <sub>x</sub> , Total P)
<b>Melbourne Laboratory - NATA # 1261 Site # 1254</b>													X				X	X	X	X	
<b>Sydney Laboratory - NATA # 1261 Site # 18217</b>					X	X	X	X		X	X	X				X	X	X	X		
<b>Mayfield Laboratory - NATA # 1261 Site # 25079 &amp; 25289</b>									X			X		X	X						
12	MW308R	Sep 26, 2023		Water	N23-Se0060082	X	X	X	X			X	X	X	X	X		X	X	X	
13	FD01	Sep 26, 2023		Water	N23-Se0060083	X						X		X				X	X	X	
14	MW302R	Sep 26, 2023		Water	N23-Se0062013	X	X	X	X			X	X	X	X	X		X	X	X	
15	MW01R_2	Sep 26, 2023		Water	N23-Se0062094					X											
<b>Test Counts</b>					2	11	11	11	11	2	2	11	11	13	11	11	11	2	13	13	13

## Internal Quality Control Review and Glossary

### General

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

### Holding Times

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

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

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

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

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

### Units

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

### Terms

<b>APHA</b>	American Public Health Association
<b>COC</b>	Chain of Custody
<b>CP</b>	Client Parent - QC was performed on samples pertaining to this report
<b>CRM</b>	Certified Reference Material (ISO17034) - reported as percent recovery.
<b>Dry</b>	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
<b>Duplicate</b>	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
<b>LOR</b>	Limit of Reporting.
<b>LCS</b>	Laboratory Control Sample - reported as percent recovery.
<b>Method Blank</b>	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
<b>NCP</b>	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
<b>RPD</b>	Relative Percent Difference between two Duplicate pieces of analysis.
<b>SPIKE</b>	Addition of the analyte to the sample and reported as percentage recovery.
<b>SRA</b>	Sample Receipt Advice
<b>Surr - Surrogate</b>	The addition of a like compound to the analyte target and reported as percentage recovery.
<b>TBTO</b>	Tributyltin oxide ( <i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
<b>TCLP</b>	Toxicity Characteristic Leaching Procedure
<b>TEQ</b>	Toxic Equivalency Quotient or Total Equivalence
<b>QSM</b>	US Department of Defense Quality Systems Manual Version 5.4
<b>US EPA</b>	United States Environmental Protection Agency
<b>WA DWER</b>	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

### QC - Acceptance Criteria

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

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

Results <10 times the LOR: No Limit

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

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

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

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

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

### QC Data General Comments

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



**Quality Control Results**

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Method Blank</b>							
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
<b>Method Blank</b>							
<b>BTEX</b>							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total*	mg/L	< 0.003			0.003	Pass	
<b>Method Blank</b>							
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>							
Naphthalene	mg/L	< 0.01			0.01	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
<b>Method Blank</b>							
<b>Polycyclic Aromatic Hydrocarbons</b>							
Acenaphthene	mg/L	< 0.001			0.001	Pass	
Acenaphthylene	mg/L	< 0.001			0.001	Pass	
Anthracene	mg/L	< 0.001			0.001	Pass	
Benz(a)anthracene	mg/L	< 0.001			0.001	Pass	
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.001			0.001	Pass	
Benzo(g,h,i)perylene	mg/L	< 0.001			0.001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.001			0.001	Pass	
Chrysene	mg/L	< 0.001			0.001	Pass	
Dibenz(a,h)anthracene	mg/L	< 0.001			0.001	Pass	
Fluoranthene	mg/L	< 0.001			0.001	Pass	
Fluorene	mg/L	< 0.001			0.001	Pass	
Indeno(1,2,3-cd)pyrene	mg/L	< 0.001			0.001	Pass	
Naphthalene	mg/L	< 0.001			0.001	Pass	
Phenanthrene	mg/L	< 0.001			0.001	Pass	
Pyrene	mg/L	< 0.001			0.001	Pass	
<b>Method Blank</b>							
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>							
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
<b>Method Blank</b>							
Nitrate & Nitrite (as N)	mg/L	< 0.05			0.05	Pass	
Nitrite (as N)	mg/L	< 0.02			0.02	Pass	
Total Kjeldahl Nitrogen (as N)	mg/L	< 0.2			0.2	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	mg/L	< 5			5	Pass	
Turbidity	NTU	< 1			1	Pass	
Phosphate total (as P)	mg/L	< 0.01			0.01	Pass	
<b>Method Blank</b>							
<b>Heavy Metals</b>							
Aluminium	mg/L	< 0.05			0.05	Pass	
Aluminium (filtered)	mg/L	< 0.05			0.05	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Arsenic	mg/L	< 0.001			0.001	Pass	
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Cadmium (filtered)	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Iron	mg/L	< 0.05			0.05	Pass	
Iron (filtered)	mg/L	< 0.05			0.05	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
<b>LCS - % Recovery</b>							
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>							
TRH C6-C9	%	109			70-130	Pass	
TRH C10-C14	%	75			70-130	Pass	
<b>LCS - % Recovery</b>							
<b>BTEX</b>							
Benzene	%	104			70-130	Pass	
Toluene	%	95			70-130	Pass	
Ethylbenzene	%	97			70-130	Pass	
m&p-Xylenes	%	103			70-130	Pass	
o-Xylene	%	97			70-130	Pass	
Xylenes - Total*	%	101			70-130	Pass	
<b>LCS - % Recovery</b>							
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>							
Naphthalene	%	84			70-130	Pass	
TRH C6-C10	%	108			70-130	Pass	
<b>LCS - % Recovery</b>							
<b>Polycyclic Aromatic Hydrocarbons</b>							
Acenaphthene	%	91			70-130	Pass	
Acenaphthylene	%	87			70-130	Pass	
Anthracene	%	115			70-130	Pass	
Benz(a)anthracene	%	94			70-130	Pass	
Benzo(a)pyrene	%	95			70-130	Pass	
Benzo(b&j)fluoranthene	%	91			70-130	Pass	
Benzo(g,h,i)perylene	%	94			70-130	Pass	
Benzo(k)fluoranthene	%	95			70-130	Pass	
Chrysene	%	96			70-130	Pass	
Dibenz(a,h)anthracene	%	93			70-130	Pass	
Fluoranthene	%	112			70-130	Pass	
Fluorene	%	105			70-130	Pass	
Indeno(1,2,3-cd)pyrene	%	93			70-130	Pass	
Naphthalene	%	73			70-130	Pass	
Phenanthrene	%	122			70-130	Pass	
Pyrene	%	113			70-130	Pass	
<b>LCS - % Recovery</b>							
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code	
TRH >C10-C16	%	84			70-130	Pass		
<b>LCS - % Recovery</b>								
Conductivity (at 25 °C)	%	100			70-130	Pass		
Nitrate & Nitrite (as N)	%	113			70-130	Pass		
Nitrite (as N)	%	80			70-130	Pass		
Total Kjeldahl Nitrogen (as N)	%	107			70-130	Pass		
Total Suspended Solids Dried at 103 °C to 105 °C	%	112			70-130	Pass		
Turbidity	%	113			70-130	Pass		
Phosphate total (as P)	%	95			70-130	Pass		
<b>LCS - % Recovery</b>								
<b>Heavy Metals</b>								
Aluminium	%	84			80-120	Pass		
Aluminium (filtered)	%	90			80-120	Pass		
Arsenic	%	93			80-120	Pass		
Arsenic (filtered)	%	94			80-120	Pass		
Cadmium	%	86			80-120	Pass		
Cadmium (filtered)	%	90			80-120	Pass		
Chromium	%	82			80-120	Pass		
Chromium (filtered)	%	89			80-120	Pass		
Copper	%	88			80-120	Pass		
Copper (filtered)	%	90			80-120	Pass		
Iron	%	95			80-120	Pass		
Iron (filtered)	%	101			80-120	Pass		
Lead	%	84			80-120	Pass		
Lead (filtered)	%	92			80-120	Pass		
Mercury	%	88			80-120	Pass		
Mercury (filtered)	%	99			80-120	Pass		
Nickel	%	80			80-120	Pass		
Nickel (filtered)	%	89			80-120	Pass		
Zinc	%	81			80-120	Pass		
Zinc (filtered)	%	91			80-120	Pass		
Test	Lab Sample ID	QA Source	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
<b>Spike - % Recovery</b>								
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>				Result 1				
TRH C10-C14	S23-Se0061682	NCP	%	78		70-130	Pass	
<b>Spike - % Recovery</b>								
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>				Result 1				
TRH >C10-C16	S23-Se0061682	NCP	%	75		70-130	Pass	
<b>Spike - % Recovery</b>								
				Result 1				
Total Kjeldahl Nitrogen (as N)	M23-Oc0000889	NCP	%	94		70-130	Pass	
Phosphate total (as P)	M23-Se0061863	NCP	%	101		70-130	Pass	
<b>Spike - % Recovery</b>								
<b>Heavy Metals</b>				Result 1				
Aluminium	S23-Se0056391	NCP	%	83		75-125	Pass	
Arsenic	S23-Se0056391	NCP	%	91		75-125	Pass	
Cadmium	S23-Se0056391	NCP	%	87		75-125	Pass	
Chromium	S23-Se0056391	NCP	%	82		75-125	Pass	
Copper	S23-Se0056391	NCP	%	88		75-125	Pass	
Iron	S23-Se0056391	NCP	%	93		75-125	Pass	
Lead	S23-Se0056391	NCP	%	83		75-125	Pass	
Mercury	S23-Se0056391	NCP	%	89		75-125	Pass	
Nickel	B23-Se0060864	NCP	%	82		75-125	Pass	
Zinc	B23-Se0060864	NCP	%	83		75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Spike - % Recovery</b>									
<b>Heavy Metals</b>				Result 1					
Copper (filtered)	S23-Se0068883	NCP	%	83			75-125	Pass	
Iron (filtered)	S23-Se0068883	NCP	%	80			75-125	Pass	
Nickel (filtered)	S23-Se0068883	NCP	%	82			75-125	Pass	
Zinc (filtered)	S23-Se0068883	NCP	%	87			75-125	Pass	
<b>Spike - % Recovery</b>									
				Result 1					
Nitrate & Nitrite (as N)	M23-Se0066915	NCP	%	122			70-130	Pass	
<b>Spike - % Recovery</b>									
<b>Heavy Metals</b>				Result 1					
Aluminium (filtered)	N23-Se0062013	CP	%	84			75-125	Pass	
Arsenic (filtered)	N23-Se0062013	CP	%	106			75-125	Pass	
Cadmium (filtered)	N23-Se0062013	CP	%	88			75-125	Pass	
Chromium (filtered)	N23-Se0062013	CP	%	83			75-125	Pass	
Lead (filtered)	N23-Se0062013	CP	%	83			75-125	Pass	
Mercury (filtered)	N23-Se0062013	CP	%	86			75-125	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Duplicate</b>									
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>				Result 1	Result 2	RPD			
TRH C6-C9	N23-Se0068945	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C10-C14	N23-Se0060071	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	N23-Se0060071	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	N23-Se0060071	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
<b>Duplicate</b>									
<b>BTEX</b>				Result 1	Result 2	RPD			
Benzene	N23-Se0068945	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Toluene	N23-Se0068945	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Ethylbenzene	N23-Se0068945	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
m&p-Xylenes	N23-Se0068945	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
o-Xylene	N23-Se0068945	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Xylenes - Total*	N23-Se0068945	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
<b>Duplicate</b>									
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>				Result 1	Result 2	RPD			
Naphthalene	N23-Se0068945	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
TRH C6-C10	N23-Se0068945	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
<b>Duplicate</b>									
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>				Result 1	Result 2	RPD			
TRH >C10-C16	N23-Se0060071	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH >C16-C34	N23-Se0060071	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C34-C40	N23-Se0060071	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
<b>Duplicate</b>									
				Result 1	Result 2	RPD			
Nitrate & Nitrite (as N)	B23-Se0036729	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
Nitrite (as N)	B23-Se0036729	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Turbidity	N23-Se0060071	CP	NTU	3.8	3.7	2.7	30%	Pass	
Phosphate total (as P)	N23-Se0060071	CP	mg/L	0.70	0.71	<1	30%	Pass	
<b>Duplicate</b>									
<b>Heavy Metals</b>				Result 1	Result 2	RPD			
Aluminium	N23-Se0060072	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
Arsenic	N23-Se0060072	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cadmium	N23-Se0060072	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium	N23-Se0060072	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper	N23-Se0060072	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	

Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Iron	N23-Se0060072	CP	mg/L	0.09	0.09	1.9	30%	Pass
Lead	N23-Se0060072	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Mercury	N23-Se0060072	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Nickel	N23-Se0060072	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Zinc	N23-Se0060072	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Thermotolerant Coliforms	N23-Se0060074	CP	CFU/100mL	< 1	< 1	<1	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Aluminium (filtered)	N23-Se0060074	CP	mg/L	0.05	< 0.05	2.4	30%	Pass
Arsenic (filtered)	N23-Se0060074	CP	mg/L	0.002	0.002	1.0	30%	Pass
Cadmium (filtered)	N23-Se0060074	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Copper (filtered)	N23-Se0060074	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Iron (filtered)	N23-Se0060074	CP	mg/L	110	97	16	30%	Pass
Nickel (filtered)	N23-Se0060074	CP	mg/L	0.047	0.046	<1	30%	Pass
Zinc (filtered)	N23-Se0060074	CP	mg/L	0.015	0.015	2.8	30%	Pass
Duplicate								
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD		
Acenaphthene	S23-Se0065780	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Acenaphthylene	S23-Se0065780	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Anthracene	S23-Se0065780	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benz(a)anthracene	S23-Se0065780	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benzo(a)pyrene	S23-Se0065780	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benzo(b&j)fluoranthene	S23-Se0065780	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benzo(g,h,i)perylene	S23-Se0065780	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benzo(k)fluoranthene	S23-Se0065780	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Chrysene	S23-Se0065780	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Dibenz(a,h)anthracene	S23-Se0065780	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Fluoranthene	S23-Se0065780	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Fluorene	S23-Se0065780	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Indeno(1,2,3-cd)pyrene	S23-Se0065780	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Naphthalene	S23-Se0065780	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Phenanthrene	S23-Se0065780	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Pyrene	S23-Se0065780	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Aluminium (filtered)	N23-Se0060075	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass
Arsenic (filtered)	N23-Se0060075	CP	mg/L	0.004	0.003	6.9	30%	Pass
Cadmium (filtered)	N23-Se0060075	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Chromium (filtered)	N23-Se0060075	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Copper (filtered)	N23-Se0060075	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Iron (filtered)	N23-Se0060075	CP	mg/L	35	34	2.6	30%	Pass
Lead (filtered)	N23-Se0060075	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Mercury (filtered)	N23-Se0060075	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Nickel (filtered)	N23-Se0060075	CP	mg/L	0.007	0.007	3.6	30%	Pass
Zinc (filtered)	N23-Se0060075	CP	mg/L	0.008	0.008	3.1	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Nitrate (as N)	M23-Se0066497	NCP	mg/L	3.5	3.4	<1	30%	Pass
Phosphate total (as P)	N23-Se0060077	CP	mg/L	0.12	0.10	18	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Total Kjeldahl Nitrogen (as N)	N23-Se0060081	CP	mg/L	28	27	2.9	30%	Pass
Phosphate total (as P)	N23-Se0060081	CP	mg/L	9.4	8.8	6.6	30%	Pass

<b>Duplicate</b>				Result 1	Result 2	RPD		
Conductivity (at 25 °C)	N23-Se0060082	CP	uS/cm	3900	3900	<1	30%	Pass
pH (at 25 °C)	N23-Se0060082	CP	pH Units	6.8	6.9	pass	30%	Pass
Total Suspended Solids Dried at 103 °C to 105 °C	N23-Se0060082	CP	mg/L	34	32	5.4	30%	Pass
Turbidity	N23-Se0060082	CP	NTU	330	330	<1	30%	Pass
<b>Duplicate</b>				Result 1	Result 2	RPD		
Conductivity (at 25 °C)	N23-Se0062013	CP	uS/cm	4200	4200	<1	30%	Pass
Total Suspended Solids Dried at 103 °C to 105 °C	N23-Se0062013	CP	mg/L	42	41	3.2	30%	Pass

**Comments**

V3- new version with repeated TRH on Se0060083 as per client request.

**Sample Integrity**

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

**Qualifier Codes/Comments**

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q09	The Surrogate recovery is outside of the recommended acceptance criteria due to matrix interference. Acceptance criteria were met for all other QC

**Authorised by:**

Andrew Black	Analytical Services Manager
Kirra Bailey	Senior Analyst-Microbiology
Mary Makarios	Senior Analyst-Inorganic
Mary Makarios	Senior Analyst-Metal
Mickael Ros	Senior Analyst-Metal
Roopesh Rangarajan	Senior Analyst-Organic
Roopesh Rangarajan	Senior Analyst-Volatile
Ryan Phillips	Senior Analyst-Inorganic



**Glenn Jackson**  
**Managing Director**

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

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

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

**CHAIN OF CUSTODY RECORD**

CLIENT DETAILS

Company Name: <b>GHD</b>	Contact Name: <b>Lachlan Parkinson</b>	Purchase Order: <b>12611010</b>	COC Number:
Office Address: <b>L3, 24 Honeysuckle Drive Newcastle 2300</b>	Project Manager: <b>Leslie Maranciak</b>	PROJECT Number: <b>12611010</b>	Eurofins   mgf quote ID: <b>180501GHD</b>
	Email for results: <b>Leslie.Maranciak@ghd.com Lachlan.Parkinson@ghd.com</b>	PROJECT Name: <b>Aurizon Hexham Water Monitoring</b>	Date output format: <b>ESDAT</b>

Special Directions & Comments:

**Please ensure fecal coliforms are reported in CFU/100ml**

Analytes

Some common holding times (with correct preservation). For further information contact the lab

Waters		Soils	
BTEX, MAH, VOC	14 days	BTEX, MAH, VOC	14 days
TRH, PAH, Phenols, Pesticides	7 days	TRH, PAH, Phenols, Pesticides	14 days
Heavy Metals	6 months	Heavy Metals	6 months
Mercury, CrVI	28 days	Mercury, CrVI	28 days
Microbiological testing	24 hours	Microbiological testing	72 hours
BOD, Nitrate, Nitrite, Total N	2 days	Anions	28 days
Solids - TSS, TDS etc	7 days	SPOCAS, pH Field and FOX, CrS	24 hours
Ferrous iron	7 days	ASLP, TCLP	7 days

Eurofins | mgf ID water batch number:

Sample ID	Date	Matrix	B4 (BTEXN / TRH / PAH)	Total Metals (Al, As, Cd, Cr, Cu, Fe, Pb, Hg, Ni, Zn)	pH, Conductivity, Turbidity, Suspended Solids	Ammonia	Suite B19A (Nutrients, Total N (TKN, NOX), Total P	Thermotolerant Coliforms (CFU/100ml)	BOD 5 Day	HOLD	Containers:						Sample comments:		
											1LP	250P	125P	1LA	40ml vial	125mL A		Jar	
1	26/09/2023	W	X	X	X	X	X	X	X										
2	26/09/2023	W	X	X	X	X	X	X	X										
3	26/09/2023	W	X	X	X	X	X	X	X										
4	26/09/2023	W	X	X	X	X	X	X	X										
5	26/09/2023	W	X	X	X	X	X	X	X										
6	26/09/2023	W	X	X	X	X	X	X	X										
7	26/09/2023	W	X	X	X	X	X	X	X										
8	26/09/2023	W	X	X	X	X	X	X	X										
9	26/09/2023	W	X	X	X	X	X	X	X										
10	26/09/2023	W	X	X	X	X	X	X	X										
11	26/09/2023	W	X	X	X	X	X	X	X										
12	26/09/2023	W	X	X	X	X	X	X	X										
13	Basin 1	W	X	X	X	X	X	X	X										
14	26/09/2023	W	X	X	X	X	X	X	X										
16	26/09/2023	W	X	X	X	X	X	X	X										
16	RB01	W	X	X			X												
17	FB01	W								X									
18		W								X									
19																			
20																			

Relinquished By: <i>E. Chalkey</i>	Laboratory Staff	Turn around time	Method Of Shipment	Temperature on arrival:
Date & Time: <i>26/9/23</i>	Received By: <i>J. Randall</i>	1 DAY <input type="checkbox"/> 2 DAY <input type="checkbox"/> 3 DAY <input type="checkbox"/>	<input type="checkbox"/> Courier	<b>14.3</b>
Signature: <i>[Signature]</i>	Date & Time: <i>26-9-23</i>	5 DAY <input checked="" type="checkbox"/> 10 DAY <input type="checkbox"/> Other:	<input type="checkbox"/> Hand Delivered	Report number:
	Signature: <i>[Signature]</i>		<input type="checkbox"/> Postal	<b>1029317</b>
			Courier Consignment #:	



## CHAIN OF CUSTODY RECORD

<b>CLIENT DETAILS</b>		Page 2 of 2
Company Name: <b>GHD</b>	Contact Name: <b>Lachlan Parkinson</b>	Purchase Order: <b>12611010</b>
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<b>Newcastle 2300</b>	Email for results: <b>Leslie.Maranciak@ghd.com</b> <b>Lachlan.Parkinson@ghd.com</b>	PROJECT Name: <b>Aurizon Hexham Water Monitoring</b>
		Data output format: <b>ESDAT</b>

<b>Special Directions &amp; Comments:</b> <div style="background-color: yellow; padding: 5px; color: red; font-weight: bold;">Please ensure fecal coliforms are reported in CFU/100ml</div>	Analytes										Some common holding times (with correct preservation). For further information contact the lab																																																																																																																																																																																																																																																							
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Relinquished By:	Laboratory Staff	Turn around time	Method Of Shipment	Temperature on arrival:
Date & Time:	Received By: <i>Mandana</i>	1 DAY <input type="checkbox"/> 2 DAY <input type="checkbox"/> 3 DAY <input type="checkbox"/>	<input type="checkbox"/> Courier	14.3
Signature:	Date & Time: <i>26-9-23</i>	5 DAY <input checked="" type="checkbox"/> 10 DAY <input type="checkbox"/> Other: _____	<input type="checkbox"/> Hand Delivered	Report number:
	Signature: <i>[Signature]</i>		<input type="checkbox"/> Postal	1029317
			Courier Consignment #:	



## CERTIFICATE OF ANALYSIS

Work Order	: <b>ES2333519</b>	Page	: 1 of 6
Amendment	: <b>1</b>		
Client	: <b>GHD PTY LTD</b>	Laboratory	: Environmental Division Sydney
Contact	: Leslie Maranciak	Contact	: Sarah Mathew
Address	: Level 3, GHD Tower, 24 Honeysuckle Drive Newcastle 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: 12611010	Date Samples Received	: 29-Sep-2023 13:15
Order number	: 12611010	Date Analysis Commenced	: 03-Oct-2023
C-O-C number	: ----	Issue Date	: 17-Oct-2023 13:38
Sampler	: ----		
Site	:		
Quote number	: EN/000		
No. of samples received	: 1		
No. of samples analysed	: 1		



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



## General Comments

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

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

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

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

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

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

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

- EP075 (SIM): Where reported, Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- Amendment (17/10/2023): This report has been amended to alter the project reference code. All analysis results are as per the previous report.



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	FD01	----	----	----	----
Sampling date / time				26-Sep-2023 00:00	----	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2333519-001	-----	-----	-----	-----	-----
				Result	---	---	---	---	---
<b>EG020F: Dissolved Metals by ICP-MS</b>									
Aluminium	7429-90-5	0.01	mg/L	0.05	----	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	0.003	----	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	----	----	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	----	----	----	----	----
Copper	7440-50-8	0.001	mg/L	<0.001	----	----	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	----	----	----	----	----
Nickel	7440-02-0	0.001	mg/L	0.059	----	----	----	----	----
Zinc	7440-66-6	0.005	mg/L	0.017	----	----	----	----	----
Iron	7439-89-6	0.05	mg/L	112	----	----	----	----	----
<b>EG035F: Dissolved Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----	----
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	----	----	----	----	----
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.5	----	----	----	----	----
<b>EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser</b>									
^ Total Nitrogen as N	----	0.1	mg/L	1.5	----	----	----	----	----
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L	0.12	----	----	----	----	----
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons</b>									
Naphthalene	91-20-3	1.0	µg/L	<1.0	----	----	----	----	----
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	----	----	----	----	----
Acenaphthene	83-32-9	1.0	µg/L	<1.0	----	----	----	----	----
Fluorene	86-73-7	1.0	µg/L	<1.0	----	----	----	----	----
Phenanthrene	85-01-8	1.0	µg/L	<1.0	----	----	----	----	----
Anthracene	120-12-7	1.0	µg/L	<1.0	----	----	----	----	----
Fluoranthene	206-44-0	1.0	µg/L	<1.0	----	----	----	----	----
Pyrene	129-00-0	1.0	µg/L	<1.0	----	----	----	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	----	----	----	----	----
Chrysene	218-01-9	1.0	µg/L	<1.0	----	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L	<1.0	----	----	----	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	----	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	----	----	----	----	----



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	FD01	----	----	----	----
Sampling date / time				26-Sep-2023 00:00	----	----	----	----	
Compound	CAS Number	LOR	Unit	ES2333519-001	-----	-----	-----	-----	
				Result	---	---	---	---	
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued</b>									
Dibenz(a,h)anthracene	53-70-3	1.0	µg/L	<1.0	----	----	----	----	
Benzo(g,h,i)perylene	191-24-2	1.0	µg/L	<1.0	----	----	----	----	
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	----	----	----	----	
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	----	----	----	----	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----	
C10 - C14 Fraction	----	50	µg/L	<50	----	----	----	----	
C15 - C28 Fraction	----	100	µg/L	<100	----	----	----	----	
C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	----	----	----	----	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	----	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----	
>C10 - C16 Fraction	----	100	µg/L	<100	----	----	----	----	
>C16 - C34 Fraction	----	100	µg/L	<100	----	----	----	----	
>C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	----	----	----	----	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	----	----	----	----	
<b>EP080: BTEXN</b>									
Benzene	71-43-2	1	µg/L	<1	----	----	----	----	
Toluene	108-88-3	2	µg/L	<2	----	----	----	----	
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----	
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----	
^ Total Xylenes	----	2	µg/L	<2	----	----	----	----	
^ Sum of BTEX	----	1	µg/L	<1	----	----	----	----	
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----	
<b>EP075(SIM)S: Phenolic Compound Surrogates</b>									
Phenol-d6	13127-88-3	1.0	%	<b>29.7</b>	----	----	----	----	
2-Chlorophenol-D4	93951-73-6	1.0	%	<b>61.0</b>	----	----	----	----	
2,4,6-Tribromophenol	118-79-6	1.0	%	<b>63.4</b>	----	----	----	----	
<b>EP075(SIM)T: PAH Surrogates</b>									



### Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	FD01	----	----	----	----
				Sampling date / time	26-Sep-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2333519-001	-----	-----	-----	-----	-----
				Result	---	---	---	---	---
<b>EP075(SIM)T: PAH Surrogates - Continued</b>									
2-Fluorobiphenyl	321-60-8	1.0	%	65.9	----	----	----	----	----
Anthracene-d10	1719-06-8	1.0	%	60.7	----	----	----	----	----
4-Terphenyl-d14	1718-51-0	1.0	%	78.6	----	----	----	----	----
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	2	%	92.3	----	----	----	----	----
Toluene-D8	2037-26-5	2	%	95.3	----	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	112	----	----	----	----	----



## Surrogate Control Limits

Sub-Matrix: WATER		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	72	143
Toluene-D8	2037-26-5	75	131
4-Bromofluorobenzene	460-00-4	73	137



## QUALITY CONTROL REPORT

Work Order : **ES2333519**

Page : 1 of 6

Amendment : **1**

Client : **GHD PTY LTD**

Laboratory : Environmental Division Sydney

Contact : Leslie Maranciak

Contact : Sarah Mathew

Address : Level 3, GHD Tower, 24 Honeysuckle Drive  
Newcastle 2300

Address : 277-289 Woodpark Road Smithfield NSW Australia 2164

Telephone : ----

Telephone : +61-2-8784 8555

Project : 12611010

Date Samples Received : 29-Sep-2023

Order number : 12611010

Date Analysis Commenced : 03-Oct-2023

C-O-C number : ----

Issue Date : 17-Oct-2023

Sampler : ----

Site :

Quote number : EN/000

No. of samples received : 1

No. of samples analysed : 1



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 Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW





## General Comments

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

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

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

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

## Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
<b>EG020F: Dissolved Metals by ICP-MS (QC Lot: 5343956)</b>									
ES2333544-010	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.009	0.009	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.015	0.015	0.0	0% - 50%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.121	0.123	1.5	0% - 20%
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.14	0.14	0.0	0% - 50%
ES2333544-002	Anonymous	EG020A-F: Iron	7439-89-6	0.05	mg/L	4.60	4.65	1.0	0% - 20%
		EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	0.0005	0.0005	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.001	0.002	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.004	0.004	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.012	0.012	0.0	No Limit
ES2333544-001	Anonymous	EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.01	0.06	138	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.07	34.2	No Limit
<b>EG035F: Dissolved Mercury by FIMS (QC Lot: 5343957)</b>									
ES2333544-001	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2333544-009	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 5342188)</b>									
ES2333527-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.26	0.27	0.0	0% - 20%
ES2333621-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	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 (%)
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 5342192)</b>									
ES2333519-001	FD01	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.5	1.6	6.6	0% - 50%
ES2333619-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.8	1.6	9.6	0% - 50%
<b>EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 5342193)</b>									
ES2333519-001	FD01	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.12	0.13	0.0	0% - 50%
ES2333619-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.09	0.09	0.0	No Limit
<b>EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5338717)</b>									
ES2333737-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES2333840-006	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5338717)</b>									
ES2333737-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES2333840-006	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
<b>EP080: BTEXN (QC Lot: 5338717)</b>									
ES2333737-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
ES2333840-006	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit



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

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

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
				Result	Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low	High
<b>EG020F: Dissolved Metals by ICP-MS (QCLot: 5343956)</b>								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	94.6	80.0	116
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	97.7	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	96.3	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	95.6	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	96.8	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	95.4	83.0	111
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	95.9	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	95.1	81.0	117
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	93.7	82.0	112
<b>EG035F: Dissolved Mercury by FIMS (QCLot: 5343957)</b>								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	98.1	83.0	105
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5342188)</b>								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	103	91.0	113
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5342192)</b>								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	# 104	69.0	101
				<0.1	1 mg/L	99.4	70.0	118
				<0.1	5 mg/L	102	70.0	130
<b>EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5342193)</b>								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	92.2	71.3	126
				<0.01	0.442 mg/L	89.2	71.3	126
				<0.01	1 mg/L	93.9	70.0	130
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 5334626)</b>								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	71.0	50.0	94.0
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	79.4	63.6	114
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	78.8	62.2	113
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	68.2	63.9	115
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	87.4	62.6	116
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	86.7	64.3	116
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	79.2	63.6	118
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	77.9	63.1	118



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
						LCS	Low	High
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 5334626) - continued</b>								
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	74.1	64.1	117
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	83.6	62.5	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	5 µg/L	81.6	61.7	119
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	71.4	63.0	115
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	70.4	63.3	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	69.0	59.9	118
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	69.4	61.2	117
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	70.1	59.1	118
<b>EP080/071: Total Petroleum Hydrocarbons (QCLot: 5334627)</b>								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	79.2	53.7	97.0
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	76.1	63.3	107
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	79.3	58.3	120
<b>EP080/071: Total Petroleum Hydrocarbons (QCLot: 5338717)</b>								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	83.5	75.0	127
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5334627)</b>								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	76.9	53.9	95.5
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	71.4	57.8	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	71.6	50.5	115
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5338717)</b>								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	77.4	75.0	127
<b>EP080: BTEXN (QCLot: 5338717)</b>								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	99.0	68.3	119
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	109	73.5	120
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	105	73.8	122
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	118	73.0	122
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	116	76.4	123
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	89.1	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: **WATER**

Matrix Spike (MS) Report		
Spike	Spike Recovery(%)	Acceptable Limits (%)



Sub-Matrix: WATER

				Matrix Spike (MS) Report				
				Spike	SpikeRecovery(%)	Acceptable Limits (%)		
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High	
<b>EG020F: Dissolved Metals by ICP-MS (QCLot: 5343956)</b>								
ES2333544-003	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	103	70.0	130	
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	91.4	70.0	130	
		EG020A-F: Chromium	7440-47-3	1 mg/L	88.6	70.0	130	
		EG020A-F: Copper	7440-50-8	1 mg/L	94.7	70.0	130	
		EG020A-F: Lead	7439-92-1	1 mg/L	87.0	70.0	130	
		EG020A-F: Nickel	7440-02-0	1 mg/L	94.3	70.0	130	
		EG020A-F: Zinc	7440-66-6	1 mg/L	94.1	70.0	130	
<b>EG035F: Dissolved Mercury by FIMS (QCLot: 5343957)</b>								
ES2333519-001	FD01	EG035F: Mercury	7439-97-6	0.01 mg/L	79.7	70.0	130	
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5342188)</b>								
ES2333527-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	108	70.0	130	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5342192)</b>								
ES2333527-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	104	70.0	130	
<b>EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5342193)</b>								
ES2333527-001	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	95.4	70.0	130	
<b>EP080/071: Total Petroleum Hydrocarbons (QCLot: 5338717)</b>								
ES2333737-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	97.0	70.0	130	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5338717)</b>								
ES2333737-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	90.3	70.0	130	
<b>EP080: BTEXN (QCLot: 5338717)</b>								
ES2333737-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	106	70.0	130	
		EP080: Toluene	108-88-3	25 µg/L	113	70.0	130	
		EP080: Ethylbenzene	100-41-4	25 µg/L	114	70.0	130	
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	125	70.0	130	
			106-42-3					
		EP080: ortho-Xylene	95-47-6	25 µg/L	122	70.0	130	
	EP080: Naphthalene	91-20-3	25 µg/L	101	70.0	130		



## QA/QC Compliance Assessment to assist with Quality Review

Work Order : ES2333519

Page : 1 of 6

Amendment : 1

Client : GHD PTY LTD

Laboratory : Environmental Division Sydney

Contact : Leslie Maranciak

Telephone : +61-2-8784 8555

Project : 12611010

Date Samples Received : 29-Sep-2023

Site :

Issue Date : 17-Oct-2023

Sampler : ----

No. of samples received : 1

Order number : 12611010

No. of samples analysed : 1

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

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

### Summary of Outliers

#### Outliers : Quality Control Samples

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

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

#### Outliers : Analysis Holding Time Compliance

- **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 : Quality Control Samples**

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
<b>Laboratory Control Spike (LCS) Recoveries</b>							
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser	QC-MRG2-53421920	----	<b>Total Kjeldahl Nitrogen as N</b>	----	104 %	69.0-101%	<b>Recovery greater than upper control limit</b>

**Outliers : Frequency of Quality Control Samples**

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Method	0				
<b>Laboratory Duplicates (DUP)</b>					
PAH/Phenols (GC/MS - SIM)	0	2	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	8	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
<b>Matrix Spikes (MS)</b>					
PAH/Phenols (GC/MS - SIM)	0	2	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	8	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

**Analysis Holding Time Compliance**

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

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

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

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

Matrix: **WATER**

Evaluation: \* = Holding time breach ; ✓ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
<b>EG020F: Dissolved Metals by ICP-MS</b>							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F) FD01	26-Sep-2023	----	----	----	06-Oct-2023	24-Mar-2024	✓
<b>EG035F: Dissolved Mercury by FIMS</b>							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F) FD01	26-Sep-2023	----	----	----	09-Oct-2023	24-Oct-2023	✓
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>							
Clear Plastic Bottle - Sulfuric Acid (EK059G) FD01	26-Sep-2023	----	----	----	06-Oct-2023	24-Oct-2023	✓
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>							
Clear Plastic Bottle - Sulfuric Acid (EK061G) FD01	26-Sep-2023	06-Oct-2023	24-Oct-2023	✓	06-Oct-2023	24-Oct-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
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>							
Clear Plastic Bottle - Sulfuric Acid (EK067G) FD01	26-Sep-2023	06-Oct-2023	24-Oct-2023	✓	06-Oct-2023	24-Oct-2023	✓
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons</b>							
Amber Glass Bottle - Unpreserved (EP075(SIM)) FD01	26-Sep-2023	03-Oct-2023	03-Oct-2023	✓	06-Oct-2023	12-Nov-2023	✓
<b>EP080/071: Total Petroleum Hydrocarbons</b>							
Amber Glass Bottle - Unpreserved (EP071) FD01	26-Sep-2023	03-Oct-2023	03-Oct-2023	✓	05-Oct-2023	12-Nov-2023	✓
Clear glass VOC vial - HCl (EP080) FD01	26-Sep-2023	06-Oct-2023	10-Oct-2023	✓	06-Oct-2023	10-Oct-2023	✓
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>							
Amber Glass Bottle - Unpreserved (EP071) FD01	26-Sep-2023	03-Oct-2023	03-Oct-2023	✓	05-Oct-2023	12-Nov-2023	✓
Clear glass VOC vial - HCl (EP080) FD01	26-Sep-2023	06-Oct-2023	10-Oct-2023	✓	06-Oct-2023	10-Oct-2023	✓
<b>EP080: BTEXN</b>							
Clear glass VOC vial - HCl (EP080) FD01	26-Sep-2023	06-Oct-2023	10-Oct-2023	✓	06-Oct-2023	10-Oct-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: **WATER**

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

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
<b>Laboratory Duplicates (DUP)</b>							
Dissolved Mercury by FIMS	EG035F	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	2	0.00	10.00	✘	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	8	0.00	10.00	✘	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
<b>Laboratory Control Samples (LCS)</b>							
Dissolved Mercury by FIMS	EG035F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	2	50.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	20	15.00	15.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	3	20	15.00	15.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	8	12.50	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
<b>Method Blanks (MB)</b>							
Dissolved Mercury by FIMS	EG035F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	2	50.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	8	12.50	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
<b>Matrix Spikes (MS)</b>							
Dissolved Mercury by FIMS	EG035F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	2	0.00	5.00	✘	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	8	0.00	5.00	✘	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



## Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl <sub>2</sub> )(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl <sub>2</sub> 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).
Nitrite and Nitrate as N (NO <sub>x</sub> ) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO <sub>3</sub> - F. Combined oxidised Nitrogen (NO <sub>2</sub> +NO <sub>3</sub> ) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)
Total Nitrogen as N (TKN + No <sub>x</sub> ) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO <sub>3</sub> -. This method is compliant with NEPM Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al, Zhang et al. This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015 The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270 Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260 Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM Schedule B(3)
Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)

Page : 6 of 6  
Work Order : ES2333519 Amendment 1  
Client : GHD PTY LTD  
Project : 12611010



<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for purging.



## SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES2333519**

Client	: <b>GHD PTY LTD</b>	Laboratory	: Environmental Division Sydney
Contact	: Leslie Maranciak	Contact	: Sarah Mathew
Address	: Level 3, GHD Tower, 24 Honeysuckle Drive Newcastle 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: leslie.maranciak@ghd.com	E-mail	: sarah.mathew@alsglobal.com
Telephone	: ----	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: 12611010 Aurizon Hexam Water Monitoring	Page	: 1 of 2
Order number	: 12611010	Quote number	: EB2020GHDSER0038 (EN/005)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	:		
Sampler	:		

### Dates

Date Samples Received	: 29-Sep-2023 13:15	Issue Date	: 30-Sep-2023
Client Requested Due Date	: 10-Oct-2023	Scheduled Reporting Date	: <b>10-Oct-2023</b>

### Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 12.5°C, 14.0°C, 13.4°C - Ice Bricks present
Receipt Detail	:	No. of samples received / analysed	: 1 / 1

### General Comments

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



GHD Pty Ltd  
3/24 Honeysuckle Dve  
Newcastle  
NSW 2300



NATA Accredited  
Accreditation Number 1261  
Site Number 18217

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

Attention: **Leslie Maranciak**

Report **1053368-W**  
Project name **AURIZON HEXHAM WATER MONITORING**  
Project ID **12611010**  
Received Date **Dec 13, 2023**

Client Sample ID			Basin 1	RB01	101R	MW106R
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N23- De0028717	N23- De0028718	N23- De0028720	N23- De0028721
Date Sampled			Dec 13, 2023	Dec 13, 2023	Dec 13, 2023	Dec 13, 2023
Test/Reference	LOR	Unit				
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	0.4	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	0.4	< 0.1	< 0.1
<b>BTEX</b>						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	96	97	96	85
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>						
Naphthalene <sup>N02</sup>	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH >C10-C16 less Naphthalene (F2) <sup>N01</sup>	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1) <sup>N04</sup>	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
<b>Polycyclic Aromatic Hydrocarbons</b>						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene <sup>N07</sup>	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1,2,3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001

Client Sample ID			Basin 1	RB01	101R	MW106R
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N23-De0028717	N23-De0028718	N23-De0028720	N23-De0028721
Date Sampled			Dec 13, 2023	Dec 13, 2023	Dec 13, 2023	Dec 13, 2023
Test/Reference	LOR	Unit				
<b>Polycyclic Aromatic Hydrocarbons</b>						
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	58	95	97	97
p-Terphenyl-d14 (surr.)	1	%	83	88	89	84
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>						
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	0.4	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	0.4	< 0.1	< 0.1
<b>Ammonia (as N)</b>						
Ammonia (as N)	0.01	mg/L	0.25	-	1.8	0.22
<b>Biochemical Oxygen Demand (BOD-5 Day)</b>						
Biochemical Oxygen Demand (BOD-5 Day)	2	mg/L	< 10	-	< 10	< 10
<b>Conductivity (at 25 °C)</b>						
Conductivity (at 25 °C)	10	uS/cm	1300	-	9600	800
<b>Nitrate &amp; Nitrite (as N)</b>						
Nitrate & Nitrite (as N)	0.05	mg/L	0.32	< 0.05	< 0.05	< 0.05
<b>Nitrate (as N)</b>						
Nitrate (as N)	0.02	mg/L	0.32	< 0.02	0.03	< 0.02
<b>Nitrite (as N)</b>						
Nitrite (as N)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
<b>pH (at 25 °C)</b>						
pH (at 25 °C)	0.1	pH Units	7.9	-	7.1	7.6
<b>Phosphate total (as P)</b>						
Phosphate total (as P)	0.01	mg/L	1.3	< 0.01	0.27	0.36
<b>Total Kjeldahl Nitrogen (as N)</b>						
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	2.6	< 0.2	4.5	0.3
<b>Total Nitrogen (as N)*</b>						
Total Nitrogen (as N)*	0.2	mg/L	2.9	< 0.2	4.5	0.3
<b>Total Suspended Solids Dried at 103 °C to 105 °C</b>						
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	7.1	-	180	120
<b>Turbidity</b>						
Turbidity	1	NTU	4.5	-	580	66
<b>Thermotolerant Coliforms</b>						
Thermotolerant Coliforms	1	CFU/100mL	M0630	-	< 1	< 1
<b>Heavy Metals</b>						
<b>Aluminium</b>						
Aluminium	0.05	mg/L	< 0.05	< 0.05	-	-
<b>Aluminium (filtered)</b>						
Aluminium (filtered)	0.05	mg/L	-	-	< 0.05	< 0.05
<b>Arsenic</b>						
Arsenic	0.001	mg/L	0.004	< 0.001	-	-
<b>Arsenic (filtered)</b>						
Arsenic (filtered)	0.001	mg/L	-	-	0.002	0.002
<b>Cadmium</b>						
Cadmium	0.0002	mg/L	< 0.0002	< 0.0002	-	-
<b>Cadmium (filtered)</b>						
Cadmium (filtered)	0.0002	mg/L	-	-	< 0.0002	< 0.0002
<b>Chromium</b>						
Chromium	0.001	mg/L	0.001	< 0.001	-	-
<b>Chromium (filtered)</b>						
Chromium (filtered)	0.001	mg/L	-	-	< 0.001	< 0.001
<b>Copper</b>						
Copper	0.001	mg/L	< 0.001	< 0.001	-	-
<b>Copper (filtered)</b>						
Copper (filtered)	0.001	mg/L	-	-	< 0.001	< 0.001
<b>Iron</b>						
Iron	0.05	mg/L	0.05	< 0.05	-	-
<b>Iron (filtered)</b>						
Iron (filtered)	0.05	mg/L	-	-	17	0.55
<b>Lead</b>						
Lead	0.001	mg/L	< 0.001	< 0.001	-	-
<b>Lead (filtered)</b>						
Lead (filtered)	0.001	mg/L	-	-	< 0.001	< 0.001
<b>Mercury</b>						
Mercury	0.0001	mg/L	< 0.0001	< 0.0001	-	-
<b>Mercury (filtered)</b>						
Mercury (filtered)	0.0001	mg/L	-	-	< 0.0001	< 0.0001
<b>Nickel</b>						
Nickel	0.001	mg/L	< 0.001	< 0.001	-	-
<b>Nickel (filtered)</b>						
Nickel (filtered)	0.001	mg/L	-	-	0.005	0.002
<b>Zinc</b>						
Zinc	0.005	mg/L	< 0.005	< 0.005	-	-
<b>Zinc (filtered)</b>						
Zinc (filtered)	0.005	mg/L	-	-	< 0.005	< 0.005

Client Sample ID			MW109	MW301R	MW302R	FD01
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N23-De0028722	N23-De0028723	N23-De0028724	N23-De0028725
Date Sampled			Dec 13, 2023	Dec 13, 2023	Dec 13, 2023	Dec 13, 2023
Test/Reference	LOR	Unit				
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
<b>BTEX</b>						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	96	100	100	100
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>						
Naphthalene <sup>N02</sup>	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH >C10-C16 less Naphthalene (F2) <sup>N01</sup>	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1) <sup>N04</sup>	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
<b>Polycyclic Aromatic Hydrocarbons</b>						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene <sup>N07</sup>	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1,2,3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	106	93	70	87
p-Terphenyl-d14 (surr.)	1	%	92	86	134	91
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>						
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
<b>Ammonia (as N)</b>						
Ammonia (as N)	0.01	mg/L	0.94	1.9	1.1	-
<b>Biochemical Oxygen Demand (BOD-5 Day)</b>						
Biochemical Oxygen Demand (BOD-5 Day)	2	mg/L	7.0	< 10	< 20	-
<b>Conductivity (at 25 °C)</b>						
Conductivity (at 25 °C)	10	uS/cm	5500	17000	4000	-
<b>Nitrate &amp; Nitrite (as N)</b>						
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05



Client Sample ID			MW109	MW301R	MW302R	FD01
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N23-De0028722	N23-De0028723	N23-De0028724	N23-De0028725
Date Sampled			Dec 13, 2023	Dec 13, 2023	Dec 13, 2023	Dec 13, 2023
Test/Reference	LOR	Unit				
Nitrate (as N)	0.02	mg/L	0.04	< 0.02	0.03	0.05
Nitrite (as N)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
pH (at 25 °C)	0.1	pH Units	7.4	7.2	4.0	-
Phosphate total (as P)	0.01	mg/L	4.4	0.95	0.03	0.63
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	3.7	4.3	2.2	2.3
Total Nitrogen (as N)*	0.2	mg/L	3.7	4.3	2.2	2.3
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	100	72	190	-
Turbidity	1	NTU	82	160	760	-
Thermotolerant Coliforms	1	CFU/100mL	M22 <sup>3</sup> 600	M23b <sup>8</sup>	M23a <sup>2</sup>	-
<b>Heavy Metals</b>						
Aluminium	0.05	mg/L	-	-	-	0.12
Aluminium (filtered)	0.05	mg/L	< 0.05	< 0.05	< 0.05	-
Arsenic	0.001	mg/L	-	-	-	0.004
Arsenic (filtered)	0.001	mg/L	0.001	0.002	0.003	-
Cadmium	0.0002	mg/L	-	-	-	< 0.0002
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	-
Chromium	0.001	mg/L	-	-	-	< 0.001
Chromium (filtered)	0.001	mg/L	0.001	< 0.001	< 0.001	-
Copper	0.001	mg/L	-	-	-	0.001
Copper (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Iron	0.05	mg/L	-	-	-	81
Iron (filtered)	0.05	mg/L	0.83	8.5	100	-
Lead	0.001	mg/L	-	-	-	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Mercury	0.0001	mg/L	-	-	-	< 0.0001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	-
Nickel	0.001	mg/L	-	-	-	0.010
Nickel (filtered)	0.001	mg/L	< 0.001	0.002	0.009	-
Zinc	0.005	mg/L	-	-	-	0.11
Zinc (filtered)	0.005	mg/L	< 0.005	< 0.005	0.085	-

**Sample History**

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

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

Description	Testing Site	Extracted	Holding Time
<b>Eurofins Suite B4</b>			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Dec 18, 2023	7 Days
BTEX - Method: LTM-ORG-2010 BTEX and Volatile TRH	Sydney	Dec 18, 2023	14 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Dec 18, 2023	7 Days
Polycyclic Aromatic Hydrocarbons - Method: LTM-ORG-2130 PAH and Phenols in Soil and Water	Sydney	Dec 18, 2023	7 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Dec 18, 2023	7 Days
Ammonia (as N) - Method: LTM-INO-4450 Determination of Nitrogen Species by Discrete Analyser	Melbourne	Dec 14, 2023	28 Days
Biochemical Oxygen Demand (BOD-5 Day) - Method: LTM-INO-4010 Biochemical Oxygen Demand (BOD5) in Water	Sydney	Dec 18, 2023	2 Days
Conductivity (at 25 °C) - Method: LTM-INO-4030 Conductivity	Sydney	Dec 18, 2023	28 Days
pH (at 25 °C) - Method: LTM-GEN-7090 pH in water by ISE	Sydney	Dec 18, 2023	0 Hour
Total Suspended Solids Dried at 103 °C to 105 °C - Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry	Sydney	Dec 18, 2023	7 Days
Turbidity - Method: LTM-INO-4140 Turbidity by Nephelometric Method	Sydney	Dec 18, 2023	2 Days
Thermotolerant Coliforms - Method: AS 4276.5 (in-house method LTM-MIC-6010)	Newcastle	Dec 13, 2023	24 Hours
Heavy Metals - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Dec 19, 2023	28 Days
Heavy Metals (filtered) - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Dec 18, 2023	180 Days
Metals M8 - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Dec 19, 2023	28 Days
Metals M8 filtered - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Dec 18, 2023	28 Days
<b>Total Nitrogen Set (as N)</b>			
Nitrate & Nitrite (as N) - Method: LTM-INO-4450 Determination of Nitrogen Species by Discrete Analyser	Melbourne	Dec 14, 2023	28 Days
Nitrate (as N) - Method: LTM-INO-4450 Determination of Nitrogen Species by Discrete Analyser	Melbourne	Dec 14, 2023	28 Days
Nitrite (as N) - Method: LTM-INO-4450 Determination of Nitrogen Species by Discrete Analyser	Melbourne	Dec 14, 2023	2 Days
Total Kjeldahl Nitrogen (as N) - Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA	Melbourne	Dec 14, 2023	28 Days
<b>Eurofins Suite B19A: Total N (TKN, NOx), Total P</b>			
Phosphate total (as P) - Method: E052 Total Phosphate (as P)	Sydney	Dec 18, 2023	28 Days

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<b>Melbourne</b> 6 Monterey Road Dandenong South VIC 3175 +61 3 8564 5000 NATA# 1261 Site# 1254	<b>Geelong</b> 19/8 Lewalan Street Grovedale VIC 3216 +61 3 8564 5000 NATA# 1261 Site# 25403	<b>Sydney</b> 179 Magowar Road Girraween NSW 2145 +61 2 9900 8400 NATA# 1261 Site# 18217	<b>Canberra</b> Unit 1,2 Dacre Street Mitchell ACT 2911 +61 2 6113 8091 NATA# 1261 Site# 25466	<b>Brisbane</b> 1/21 Smallwood Place Murarie QLD 4172 T: +61 7 3902 4600 NATA# 1261 Site# 20794	<b>Newcastle</b> 1/2 Frost Drive Mayfield West NSW 2304 +61 2 4968 8448 NATA# 1261 Site# 25079 & 25289	<b>Perth</b> 46-48 Banksia Road Welshpool WA 6106 +61 8 6253 4444 NATA# 2377 Site# 2370	<b>Auckland</b> 35 O'Rorke Road Penrose, Auckland 1061 +64 9 526 4551 IANZ# 1327	<b>Auckland (Asb)</b> Unit C1/4 Pacific Rise, Mount Wellington, Auckland 1061 +64 9 525 0568 IANZ# 1308	<b>Christchurch</b> 43 Detroit Drive Rolleston, Christchurch 7675 +64 3 343 5201 IANZ# 1290	<b>Tauranga</b> 1277 Cameron Road, Gate Pa, Tauranga 3112 +64 9 525 0568 IANZ# 1402
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<b>Company Name:</b> GHD Pty Ltd NEWCASTLE	<b>Order No.:</b>	<b>Received:</b> Dec 13, 2023 12:10 PM
<b>Address:</b> 3/24 Honeysuckle Dve Newcastle NSW 2300	<b>Report #:</b> 1053368	<b>Due:</b> Dec 20, 2023
	<b>Phone:</b> 02 4979 9999	<b>Priority:</b> 5 Day
	<b>Fax:</b> 02 4979 9988	<b>Contact Name:</b> Leslie Maranciak
<b>Project Name:</b> AURIZON HEXHAM WATER MONITORING		
<b>Project ID:</b> 12611010		

**Eurofins Analytical Services Manager : Andrew Black**

Sample Detail						Aluminium	Aluminium (filtered)	Ammonia (as N)	Biochemical Oxygen Demand (BOD-5 Day)	Conductivity (at 25 °C)	HOLD	Iron	Iron (filtered)	pH (at 25 °C)	Thermotolerant Coliforms	Total Suspended Solids Dried at 103 °C to 105 °C	Turbidity	Metals M8	Metals M8 filtered	Eurofins Suite B4	Eurofins Suite B19A: Total N (TKN, NOx), Total P
<b>Melbourne Laboratory - NATA # 1261 Site # 1254</b>								X										X	X	X	X
<b>Sydney Laboratory - NATA # 1261 Site # 18217</b>						X	X		X	X	X	X	X	X		X	X	X	X	X	X
<b>Mayfield Laboratory - NATA # 1261 Site # 25079 &amp; 25289</b>														X							
<b>External Laboratory</b>																					
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID																
1	Basin 1	Dec 13, 2023		Water	N23-De0028717	X		X	X	X		X		X	X	X	X	X		X	X
2	RB01	Dec 13, 2023		Water	N23-De0028718	X						X						X		X	X
3	FB01	Dec 13, 2023		Water	N23-De0028719						X										
4	101R	Dec 13, 2023		Water	N23-De0028720		X	X	X	X		X	X	X	X	X	X		X	X	X
5	MW106R	Dec 13, 2023		Water	N23-De0028721		X	X	X	X		X	X	X	X	X	X		X	X	X
6	MW109	Dec 13, 2023		Water	N23-De0028722		X	X	X	X		X	X	X	X	X	X		X	X	X
7	MW301R	Dec 13, 2023		Water	N23-De0028723		X	X	X	X		X	X	X	X	X	X		X	X	X
8	MW302R	Dec 13, 2023		Water	N23-De0028724		X	X	X	X		X	X	X	X	X	X		X	X	X
9	FD01	Dec 13, 2023		Water	N23-De0028725	X						X						X		X	X
<b>Test Counts</b>						3	5	6	6	6	1	3	5	6	6	6	6	3	5	8	8

## Internal Quality Control Review and Glossary

### General

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

### Holding Times

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

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

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

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

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

### Units

<b>mg/kg:</b> milligrams per kilogram	<b>mg/L:</b> milligrams per litre	<b>ppm:</b> parts per million
<b>µg/L:</b> micrograms per litre	<b>ppb:</b> parts per billion	<b>%:</b> Percentage
<b>org/100 mL:</b> Organisms per 100 millilitres	<b>NTU:</b> Nephelometric Turbidity Units	<b>MPN/100 mL:</b> Most Probable Number of organisms per 100 millilitres
<b>CFU:</b> Colony forming unit	<b>Colour:</b> Pt-Co Units	

### Terms

<b>APHA</b>	American Public Health Association
<b>CEC</b>	Cation Exchange Capacity
<b>COC</b>	Chain of Custody
<b>CP</b>	Client Parent - QC was performed on samples pertaining to this report
<b>CRM</b>	Certified Reference Material (ISO17034) - reported as percent recovery.
<b>Dry</b>	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
<b>Duplicate</b>	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
<b>LOR</b>	Limit of Reporting.
<b>LCS</b>	Laboratory Control Sample - reported as percent recovery.
<b>Method Blank</b>	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
<b>NCP</b>	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
<b>RPD</b>	Relative Percent Difference between two Duplicate pieces of analysis.
<b>SPIKE</b>	Addition of the analyte to the sample and reported as percentage recovery.
<b>SRA</b>	Sample Receipt Advice
<b>Surr - Surrogate</b>	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
<b>TBTO</b>	Tributyltin oxide ( <i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
<b>TCLP</b>	Toxicity Characteristic Leaching Procedure
<b>TEQ</b>	Toxic Equivalency Quotient or Total Equivalence
<b>QSM</b>	US Department of Defense Quality Systems Manual Version 5.4
<b>US EPA</b>	United States Environmental Protection Agency
<b>WA DWER</b>	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

### QC - Acceptance Criteria

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

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

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

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

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 70 – 130%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 5.4, where no positive PFAS results have been reported or reviewed, and no data was affected.

### QC Data General Comments

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

**Quality Control Results**

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Method Blank</b>							
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
<b>Method Blank</b>							
<b>BTEX</b>							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total*	mg/L	< 0.003			0.003	Pass	
<b>Method Blank</b>							
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>							
Naphthalene	mg/L	< 0.01			0.01	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
<b>Method Blank</b>							
<b>Polycyclic Aromatic Hydrocarbons</b>							
Acenaphthene	mg/L	< 0.001			0.001	Pass	
Acenaphthylene	mg/L	< 0.001			0.001	Pass	
Anthracene	mg/L	< 0.001			0.001	Pass	
Benz(a)anthracene	mg/L	< 0.001			0.001	Pass	
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.001			0.001	Pass	
Benzo(g,h,i)perylene	mg/L	< 0.001			0.001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.001			0.001	Pass	
Chrysene	mg/L	< 0.001			0.001	Pass	
Dibenz(a,h)anthracene	mg/L	< 0.001			0.001	Pass	
Fluoranthene	mg/L	< 0.001			0.001	Pass	
Fluorene	mg/L	< 0.001			0.001	Pass	
Indeno(1,2,3-cd)pyrene	mg/L	< 0.001			0.001	Pass	
Naphthalene	mg/L	< 0.001			0.001	Pass	
Phenanthrene	mg/L	< 0.001			0.001	Pass	
Pyrene	mg/L	< 0.001			0.001	Pass	
<b>Method Blank</b>							
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>							
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
<b>Method Blank</b>							
Ammonia (as N)	mg/L	< 0.01			0.01	Pass	
Biochemical Oxygen Demand (BOD-5 Day)	mg/L	< 2			2	Pass	
Conductivity (at 25 °C)	uS/cm	< 10			10	Pass	
Nitrate & Nitrite (as N)	mg/L	< 0.05			0.05	Pass	
Nitrite (as N)	mg/L	< 0.02			0.02	Pass	
Phosphate total (as P)	mg/L	< 0.01			0.01	Pass	
Total Kjeldahl Nitrogen (as N)	mg/L	< 0.2			0.2	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	mg/L	< 5			5	Pass	
Turbidity	NTU	< 1			1	Pass	
<b>Method Blank</b>							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Heavy Metals</b>							
Aluminium	mg/L	< 0.05			0.05	Pass	
Aluminium (filtered)	mg/L	< 0.05			0.05	Pass	
Arsenic	mg/L	< 0.001			0.001	Pass	
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Cadmium (filtered)	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Iron	mg/L	< 0.05			0.05	Pass	
Iron (filtered)	mg/L	< 0.05			0.05	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
<b>LCS - % Recovery</b>							
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>							
TRH C6-C9	%	105			70-130	Pass	
TRH C10-C14	%	115			70-130	Pass	
<b>LCS - % Recovery</b>							
<b>BTEX</b>							
Benzene	%	115			70-130	Pass	
Toluene	%	111			70-130	Pass	
Ethylbenzene	%	102			70-130	Pass	
m&p-Xylenes	%	110			70-130	Pass	
o-Xylene	%	108			70-130	Pass	
Xylenes - Total*	%	109			70-130	Pass	
<b>LCS - % Recovery</b>							
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>							
Naphthalene	%	130			70-130	Pass	
TRH C6-C10	%	103			70-130	Pass	
<b>LCS - % Recovery</b>							
<b>Polycyclic Aromatic Hydrocarbons</b>							
Acenaphthene	%	87			70-130	Pass	
Acenaphthylene	%	87			70-130	Pass	
Anthracene	%	105			70-130	Pass	
Benz(a)anthracene	%	97			70-130	Pass	
Benzo(a)pyrene	%	97			70-130	Pass	
Benzo(b&j)fluoranthene	%	98			70-130	Pass	
Benzo(g,h,i)perylene	%	97			70-130	Pass	
Benzo(k)fluoranthene	%	103			70-130	Pass	
Chrysene	%	106			70-130	Pass	
Dibenz(a,h)anthracene	%	96			70-130	Pass	
Fluoranthene	%	100			70-130	Pass	
Fluorene	%	98			70-130	Pass	
Indeno(1,2,3-cd)pyrene	%	97			70-130	Pass	
Naphthalene	%	92			70-130	Pass	
Phenanthrene	%	99			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code	
Pyrene	%	102			70-130	Pass		
<b>LCS - % Recovery</b>								
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>								
TRH >C10-C16	%	107			70-130	Pass		
<b>LCS - % Recovery</b>								
Ammonia (as N)	%	111			70-130	Pass		
Conductivity (at 25 °C)	%	97			70-130	Pass		
Nitrate & Nitrite (as N)	%	120			70-130	Pass		
Nitrite (as N)	%	97			70-130	Pass		
Phosphate total (as P)	%	92			70-130	Pass		
Total Kjeldahl Nitrogen (as N)	%	96			70-130	Pass		
Total Suspended Solids Dried at 103 °C to 105 °C	%	109			70-130	Pass		
Turbidity	%	98			70-130	Pass		
<b>LCS - % Recovery</b>								
<b>Heavy Metals</b>								
Aluminium	%	99			80-120	Pass		
Aluminium (filtered)	%	96			80-120	Pass		
Arsenic	%	96			80-120	Pass		
Arsenic (filtered)	%	92			80-120	Pass		
Cadmium	%	96			80-120	Pass		
Cadmium (filtered)	%	93			80-120	Pass		
Chromium	%	95			80-120	Pass		
Chromium (filtered)	%	96			80-120	Pass		
Copper	%	94			80-120	Pass		
Copper (filtered)	%	96			80-120	Pass		
Iron	%	100			80-120	Pass		
Iron (filtered)	%	99			80-120	Pass		
Lead	%	92			80-120	Pass		
Lead (filtered)	%	92			80-120	Pass		
Mercury	%	95			80-120	Pass		
Mercury (filtered)	%	99			80-120	Pass		
Nickel	%	92			80-120	Pass		
Nickel (filtered)	%	96			80-120	Pass		
Zinc	%	94			80-120	Pass		
Zinc (filtered)	%	97			80-120	Pass		
Test	Lab Sample ID	QA Source	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
<b>Spike - % Recovery</b>								
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>								
TRH C10-C14	S23-De0039620	NCP	%	113		70-130	Pass	
<b>Spike - % Recovery</b>								
<b>Polycyclic Aromatic Hydrocarbons</b>								
Acenaphthene	S23-De0031577	NCP	%	116		70-130	Pass	
Acenaphthylene	S23-De0031577	NCP	%	117		70-130	Pass	
Anthracene	S23-De0031577	NCP	%	117		70-130	Pass	
Benz(a)anthracene	S23-De0031577	NCP	%	121		70-130	Pass	
Benzo(a)pyrene	S23-De0031577	NCP	%	127		70-130	Pass	
Benzo(b&i)fluoranthene	S23-De0031577	NCP	%	127		70-130	Pass	
Benzo(g,h,i)perylene	S23-De0031577	NCP	%	123		70-130	Pass	
Dibenz(a,h)anthracene	S23-De0031577	NCP	%	117		70-130	Pass	
Fluoranthene	S23-De0031577	NCP	%	125		70-130	Pass	
Fluorene	S23-De0031577	NCP	%	119		70-130	Pass	
Indeno(1,2,3-cd)pyrene	S23-De0031577	NCP	%	121		70-130	Pass	
Naphthalene	S23-De0031577	NCP	%	103		70-130	Pass	
Phenanthrene	S23-De0031577	NCP	%	116		70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Pyrene	S23-De0031577	NCP	%	126			70-130	Pass	
<b>Spike - % Recovery</b>									
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>				Result 1					
TRH >C10-C16	S23-De0039620	NCP	%	103			70-130	Pass	
<b>Spike - % Recovery</b>									
				Result 1					
Nitrate & Nitrite (as N)	M23-De0026070	NCP	%	103			70-130	Pass	
Nitrite (as N)	M23-De0026070	NCP	%	98			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	M23-De0036292	NCP	%	94			70-130	Pass	
<b>Spike - % Recovery</b>									
<b>Heavy Metals</b>				Result 1					
Aluminium	R23-De0029284	NCP	%	99			75-125	Pass	
Arsenic	R23-De0029284	NCP	%	90			75-125	Pass	
Cadmium	R23-De0029284	NCP	%	91			75-125	Pass	
Chromium	R23-De0029284	NCP	%	96			75-125	Pass	
Copper	R23-De0029284	NCP	%	85			75-125	Pass	
Iron	R23-De0029284	NCP	%	93			75-125	Pass	
Lead	R23-De0029284	NCP	%	96			75-125	Pass	
Mercury	R23-De0029284	NCP	%	106			75-125	Pass	
Nickel	R23-De0029284	NCP	%	93			75-125	Pass	
Zinc	R23-De0029284	NCP	%	92			75-125	Pass	
<b>Spike - % Recovery</b>									
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>				Result 1					
TRH C6-C9	N23-De0028718	CP	%	97			70-130	Pass	
<b>Spike - % Recovery</b>									
<b>BTEX</b>				Result 1					
Benzene	N23-De0028718	CP	%	108			70-130	Pass	
Toluene	N23-De0028718	CP	%	110			70-130	Pass	
Ethylbenzene	N23-De0028718	CP	%	101			70-130	Pass	
m&p-Xylenes	N23-De0028718	CP	%	110			70-130	Pass	
o-Xylene	N23-De0028718	CP	%	109			70-130	Pass	
Xylenes - Total*	N23-De0028718	CP	%	110			70-130	Pass	
<b>Spike - % Recovery</b>									
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>				Result 1					
Naphthalene	N23-De0028718	CP	%	126			70-130	Pass	
TRH C6-C10	N23-De0028718	CP	%	95			70-130	Pass	
<b>Spike - % Recovery</b>									
<b>Heavy Metals</b>				Result 1					
Arsenic (filtered)	N23-De0032115	NCP	%	98			75-125	Pass	
Cadmium (filtered)	N23-De0032115	NCP	%	93			75-125	Pass	
Chromium (filtered)	N23-De0032115	NCP	%	90			75-125	Pass	
Copper (filtered)	N23-De0032115	NCP	%	84			75-125	Pass	
Lead (filtered)	N23-De0032115	NCP	%	84			75-125	Pass	
Mercury (filtered)	N23-De0032115	NCP	%	93			75-125	Pass	
<b>Spike - % Recovery</b>									
				Result 1					
Total Suspended Solids Dried at 103 °C to 105 °C	N23-De0028723	CP	%	102			70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Duplicate</b>									
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>				Result 1	Result 2	RPD			
TRH C6-C9	S23-De0029671	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C10-C14	S23-De0039619	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	S23-De0039619	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	S23-De0039619	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	



Duplicate								
<b>BTEX</b>				Result 1	Result 2	RPD		
Benzene	S23-De0029671	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Toluene	S23-De0029671	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Ethylbenzene	S23-De0029671	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
m&p-Xylenes	S23-De0029671	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass
o-Xylene	S23-De0029671	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Xylenes - Total*	S23-De0029671	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass
Duplicate								
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>				Result 1	Result 2	RPD		
Naphthalene	S23-De0029671	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass
TRH C6-C10	S23-De0029671	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass
Duplicate								
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>				Result 1	Result 2	RPD		
TRH >C10-C16	S23-De0039619	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass
TRH >C16-C34	S23-De0039619	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass
TRH >C34-C40	S23-De0039619	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Ammonia (as N)	M23-De0026069	NCP	mg/L	15	15	<1	30%	Pass
Nitrate & Nitrite (as N)	M23-De0026069	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass
Nitrate (as N)	M23-De0029577	NCP	mg/L	10	10	<1	30%	Pass
Nitrite (as N)	M23-De0026069	NCP	mg/L	0.09	< 0.02	200	30%	Fail
Phosphate total (as P)	S23-De0044417	NCP	mg/L	0.04	0.04	16	30%	Pass
Total Kjeldahl Nitrogen (as N)	M23-De0036294	NCP	mg/L	48	44	8.9	30%	Pass
Turbidity	S23-De0044554	NCP	NTU	1.2	1.2	<1	30%	Pass
Duplicate								
<b>Heavy Metals</b>				Result 1	Result 2	RPD		
Aluminium	N23-De0028717	CP	mg/L	< 0.05	0.05	2.9	30%	Pass
Arsenic	N23-De0028717	CP	mg/L	0.004	0.004	2.5	30%	Pass
Cadmium	N23-De0028717	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Chromium	N23-De0028717	CP	mg/L	0.001	< 0.001	12	30%	Pass
Copper	N23-De0028717	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Iron	N23-De0028717	CP	mg/L	0.05	0.06	12	30%	Pass
Lead	N23-De0028717	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Mercury	N23-De0028717	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Nickel	N23-De0028717	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Zinc	N23-De0028717	CP	mg/L	< 0.005	0.006	74	30%	Fail
Duplicate								
<b>Heavy Metals</b>				Result 1	Result 2	RPD		
Arsenic	N23-De0028718	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Chromium	N23-De0028718	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Copper	N23-De0028718	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Lead	N23-De0028718	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Nickel	N23-De0028718	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Zinc	N23-De0028718	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Duplicate								
<b>Heavy Metals</b>				Result 1	Result 2	RPD		
Aluminium (filtered)	N23-De0028720	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass
Arsenic (filtered)	N23-De0028720	CP	mg/L	0.002	0.002	5.9	30%	Pass
Cadmium (filtered)	N23-De0028720	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Chromium (filtered)	N23-De0028720	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Copper (filtered)	N23-De0028720	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Iron (filtered)	N23-De0028720	CP	mg/L	17	17	<1	30%	Pass
Lead (filtered)	N23-De0028720	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Mercury (filtered)	N23-De0028720	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass

<b>Duplicate</b>								
<b>Heavy Metals</b>				Result 1	Result 2	RPD		
Nickel (filtered)	N23-De0028720	CP	mg/L	0.005	0.005	3.3	30%	Pass
Zinc (filtered)	N23-De0028720	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass
<b>Duplicate</b>								
				Result 1	Result 2	RPD		
Total Suspended Solids Dried at 103 °C to 105 °C	N23-De0028722	CP	mg/L	100	100	<1	30%	Pass
<b>Duplicate</b>								
				Result 1	Result 2	RPD		
Conductivity (at 25 °C)	N23-De0028723	CP	uS/cm	17000	17000	<1	30%	Pass
Total Suspended Solids Dried at 103 °C to 105 °C	N23-De0028723	CP	mg/L	72	71	1.1	30%	Pass

**Comments**
**Sample Integrity**

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

**Qualifier Codes/Comments**

Code	Description
M06	Presence of high background may be masking the detection of target organisms
M22	Due to the presence of large amounts of sediment in the samples, they were either mixed and allowed to stand or not mixed and then the supernatant sampled. This may not be a true representative of the samples and the enumeration results may have been impacted.
M23a	AS 4276.1:2021 Water microbiology, Method 1: Water quality - General requirements and guidance for microbiological examinations by culture. For 1 or 2 colonies the result is reported as "Presence"
M23b	AS 4276.1:2021 Water microbiology, Method 1: Water quality - General requirements and guidance for microbiological examinations by culture. For 3 to 9 colonies, the result is reported as "Estimate"
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

**Authorised by:**

Adam Bateup	Analytical Services Manager
Kirra Bailey	Senior Analyst-Microbiology
Mary Makarios	Senior Analyst-Inorganic
Mickael Ros	Senior Analyst-Metal
Roopesh Rangarajan	Senior Analyst-Organic
Roopesh Rangarajan	Senior Analyst-Volatile
Ryan Phillips	Senior Analyst-Inorganic



**Glenn Jackson**  
**Managing Director**

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

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

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

**Eurofins Environment Testing Australia Pty Ltd**

ABN: 50 005 085 521

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**Eurofins ARL Pty Ltd**

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46-48 Banksia Road Welshpool WA 6106 +61 8 6253 4444 NATA# 2377 Site# 2370

**Eurofins Environment Testing NZ Ltd**

NZBN: 9429046024954

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## Sample Receipt Advice

<b>Company name:</b>	GHD Pty Ltd NEWCASTLE
<b>Contact name:</b>	Leslie Maranciak
<b>Project name:</b>	AURIZON HEXHAM WATER MONITORING
<b>Project ID:</b>	12611010
<b>Turnaround time:</b>	5 Day
<b>Date/Time received</b>	Dec 13, 2023 12:10 PM
<b>Eurofins reference</b>	1053368

## Sample Information

- ✓ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ✓ Sample Temperature of chilled sample on the batch as recorded by Eurofins Sample Receipt : 20.3 degrees Celsius.
- ✓ All samples have been received as described on the above COC.
- ✓ COC has been completed correctly.
- ✓ Attempt to chill was evident.
- ✓ Appropriately preserved sample containers have been used.
- ✓ All samples were received in good condition.
- ✓ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ✓ Appropriate sample containers have been used.
- ✓ Sample containers for volatile analysis received with zero headspace.
- ✓ Split sample sent to requested external lab.
- ✗ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

## Notes

FD02 sent to ALS

## Contact

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

**Andrew Black on phone : (+61) 2 9900 8490 or by email: AndrewBlack@eurofins.com**

Results will be delivered electronically via email to Leslie Maranciak - leslie.maranciak@ghd.com.

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



mgt

**Sydney**  
 Unit F3 - 6 Building F, 16 Mars Road, Lane Cove  
 Phone: +612 3902 4600  
 Email: enviro.syd@mglabmark.com.au

**Brisbane**  
 Unit 1-21 Smallwood Place, Murrarie  
 Phone: +617 3902 4600  
 Email: enviro.bris@mglabmark.com.au

**Melbourne**  
 2 Kingston Town Close, Oakleigh, VIC 3188  
 Phone: +613 8564 5000 Fax: +613 8564 5090  
 Email: enquires.melb@mglabmark.com.au

### CHAIN OF CUSTODY RECORD

Page 1 of 2

#### CLIENT DETAILS

Company Name: <b>GHD</b>	Contact Name: <b>Lachlan Parkinson</b>	Purchase Order: <b>12611010</b>	COC Number:
Office Address: <b>L3, 24 Honeysuckle Drive Newcastle 2300</b>	Project Manager: <b>Leslie Maranciak</b>	PROJECT Number: <b>12611010</b>	Eurofins   mgt quote ID: <b>180501GHD</b>
	Email for results: <b>Leslie.Maranciak@ghd.com Lachlan.Parkinson@ghd.com</b>	PROJECT Name: <b>Aurizon Hexham Water Monitoring</b>	Data output format: <b>ESDAT</b>

#### Special Directions & Comments:

**Please ensure fecal coliforms are reported in CFU/100ml**

Eurofins | mgt DI water batch number:

Sample ID	Date	Matrix	Analytes										Some common holding times (with correct preservation). For further information contact the lab							Sample comments:		
			B5 (BTEXN / TRH / PAH)	Total Metals (Al, As, Cd, Cr, Cu, Fe, Pb, Hg, Ni, Zn)	pH, Conductivity, Turbidity, Suspended Solids	Ammonia	Soil B15A (Nutrients: Total N (TKN, NOX), Total P)	Thermotolerant Coliforms (CFU/100ml)	BOD 5 Day	HOLD	Waters			Soils								
1	SW1	13/12/2023	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
2	SW2	13/12/2023	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
3	SW3	13/12/2023	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
4	SW4	13/12/2023	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
5	SW5	13/12/2023	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
6	SW6	13/12/2023	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
7	SW7	13/12/2023	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
8	SW8	13/12/2023	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
9	SW9	13/12/2023	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
10	SW10	13/12/2023	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
11	SW11	13/12/2023	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
12	SW12	13/12/2023	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
13	Basin 1	13/12/2023	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
14	Basin 2	13/12/2023	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
15	Basin 3	13/12/2023	W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
16	RB01	13/12/2023	W	X	X				X													
17	FB01	13/12/2023	W																		X	
18																						
19																						
20																						

Relinquished By: <i>[Signature]</i>	Received By: <i>[Signature]</i>	Turn around time		Method Of Shipment		Temperature on arrival:
Date & Time: <i>14/1/23</i>	Date & Time: <i>12:10 13/12</i>	1 DAY <input type="checkbox"/>	2 DAY <input type="checkbox"/>	3 DAY <input type="checkbox"/>	<input type="checkbox"/> Courier	<i>20.3</i>
Signature: <i>[Signature]</i>	Signature: <i>[Signature]</i>	5 DAY <input checked="" type="checkbox"/>	10 DAY <input type="checkbox"/>	Other: <input type="checkbox"/>	<input type="checkbox"/> Hand Delivered	Report number: <i>1083368</i>
					<input type="checkbox"/> Postal	
					Courier Consignment #:	

## CHAIN OF CUSTODY RECORD

**CLIENT DETAILS**

Company Name : GHD	Contact Name: Lachlan Parkinson	Purchase Order : 12611010	Page 2 of 2
Office Address : L3, 24 Honeysuckle Drive Newcastle 2300	Project Manager : Leslie Maranciak	PROJECT Number : 12611010	COC Number :
	Email for results : <u>Leslie.Maranciak@ghd.com</u> <i>Lachlan.Parkinson@ghd.com</i>	PROJECT Name : Aunzon Hexham Water Monitoring	Eurofins   mgt quote ID : 180501GHD
			Data output format: ESDAT

**Special Directions & Comments :**

**Please ensure fecal coliforms are reported in CFU/100ml**

**Analytes**

**Some common holding times (with correct preservation). For further information contact the lab**

Sample ID	Date	Matrix	B4 (BTEXN / TRH / PAH)	Dissolved Metals (Al, As, Cd, Cr, Cu, Fe, Pb, Hg, Ni, Zn)	pH, Conductivity, Turbidity, Suspended Solids	Ammonia	Suite 816a (Nutrients, Total N (TKN, NOX), Total P	Thermotolerant Coliforms (CFU/100ml)	BOD 5 Day	Send to ALS - same analysis as FD01 at ALS please
21	13/12/2023	W	X	X	X	X	X	X	X	
22	13/12/2023	W	X	X	X	X	X	X	X	
23	13/12/2023	W	X	X	X	X	X	X	X	
24	13/12/2023	W	X	X	X	X	X	X	X	
25	13/12/2023	W	X	X	X	X	X	X	X	
26	13/12/2023	W	X	X	X	X	X	X	X	
27	13/12/2023	W	X	X	X	X	X	X	X	
28	13/12/2023	W	X	X	X	X	X	X	X	
29	13/12/2023	W	X	X	X	X	X	X	X	
30	13/12/2023	W	X	X	X	X	X	X	X	
31	13/12/2023	W	X	X	X	X	X	X	X	
32	13/12/2023	W	X	X						
33	13/12/2023	W								X
34										
35										
36										
37										

Waters		Soils	
BTEX, MAH, VOC	14 days	BTEX, MAH, VOC	14 days
TRH, PAH, Phenols, Pesticides	7 days	TRH, PAH, Phenols, Pesticides	14 days
Heavy Metals	6 months	Heavy Metals	6 months
Mercury, CrVI	28 days	Mercury, CrVI	28 days
Microbiological testing	24 hours	Microbiological testing	72 hours
BOD, Nitrate, Nitrite, Total N	2 days	Anions	28 days
Solids - TSS, TDS etc	7 days	SPOCAS, pH Field and FOX, CrS	24 hours
Ferrous iron	7 days	ASLP, TCLP	7 days

Eurofins | mgt DI water/ batch number:

**Containers:**

1LP	250P	125P	1LA	40mL vial	125mL A	Jar
-----	------	------	-----	-----------	---------	-----

**Sample comments:**

Send to ALS for Same Analysis as FD01

Relinquished By: <i>L. Parkinson</i>	Receive By: <i>Stander</i>	Turn around time	Method Of Shipment	Temperature on arrival: 20.3
Date & Time: 13/12/23	Date & Time: 13/12 12:10	1 DAY <input type="checkbox"/> 2 DAY <input type="checkbox"/> 3 DAY <input type="checkbox"/>	<input type="checkbox"/> Courier <input type="checkbox"/> Hand Delivered <input type="checkbox"/> Postal Courier Consignment # :	Report number: 105338
Signature: <i>[Signature]</i>	Signature: <i>[Signature]</i>	6 DAY <input checked="" type="checkbox"/> 10 DAY <input type="checkbox"/> Other:		

GHD Pty Ltd  
3/24 Honeysuckle Dve  
Newcastle  
NSW 2300



NATA Accredited  
Accreditation Number 1261  
Site Number 18217

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

Attention: **Leslie Maranciak**

Report **1054805-W**  
Project name **AURIZON HEXHAM WATER MONITORING**  
Project ID **1611010**  
Received Date **Dec 18, 2023**

Client Sample ID			MW01R	MW101R	MW108R	MW02
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N23- De0040730	N23- De0040731	N23- De0040732	N23- De0040733
Date Sampled			Dec 18, 2023	Dec 18, 2023	Dec 18, 2023	Dec 18, 2023
Test/Reference	LOR	Unit				
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
<b>BTEX</b>						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	65	70	66	75
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>						
Naphthalene <sup>N02</sup>	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH >C10-C16 less Naphthalene (F2) <sup>N01</sup>	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1) <sup>N04</sup>	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
<b>Polycyclic Aromatic Hydrocarbons</b>						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene <sup>N07</sup>	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1,2,3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001

Client Sample ID			MW01R	MW101R	MW108R	MW02
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N23-De0040730	N23-De0040731	N23-De0040732	N23-De0040733
Date Sampled			Dec 18, 2023	Dec 18, 2023	Dec 18, 2023	Dec 18, 2023
Test/Reference	LOR	Unit				
<b>Polycyclic Aromatic Hydrocarbons</b>						
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	55	55	52	58
p-Terphenyl-d14 (surr.)	1	%	97	105	135	109
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>						
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
<b>Ammonia (as N)</b>						
Ammonia (as N)	0.01	mg/L	1.4	1.8	0.44	0.43
<b>Biochemical Oxygen Demand (BOD-5 Day)</b>						
Biochemical Oxygen Demand (BOD-5 Day)	2	mg/L	< 10	< 10	< 5	< 10
<b>Conductivity (at 25 °C)</b>						
Conductivity (at 25 °C)	10	uS/cm	22000	32000	4000	2000
<b>Nitrate &amp; Nitrite (as N)</b>						
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05	0.10	< 0.05	< 0.05
<b>Nitrate (as N)</b>						
Nitrate (as N)	0.02	mg/L	< 0.02	0.10	0.03	< 0.02
<b>Nitrite (as N)</b>						
Nitrite (as N)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
<b>pH (at 25 °C)</b>						
pH (at 25 °C)	0.1	pH Units	6.8	6.6	6.7	5.8
<b>Total Kjeldahl Nitrogen (as N)</b>						
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	2.7	2.9	0.5	1.4
<b>Total Nitrogen (as N)*</b>						
Total Nitrogen (as N)*	0.2	mg/L	2.7	3.0	0.5	1.4
<b>Total Suspended Solids Dried at 103 °C to 105 °C</b>						
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	7.4	74	34	14
<b>Turbidity</b>						
Turbidity	1	NTU	950	160	44	85
<b>Phosphate total (as P)</b>						
Phosphate total (as P)	0.01	mg/L	0.75	-	-	-
<b>Thermotolerant Coliforms</b>						
Thermotolerant Coliforms	1	CFU/100mL	< 1	M23a2	6000	M23a1
<b>Phosphate total (as P)</b>						
Phosphate total (as P)	0.01	mg/L	-	0.26	0.02	< 0.01
<b>Heavy Metals</b>						
<b>Aluminium (filtered)</b>						
Aluminium (filtered)	0.05	mg/L	< 0.05	0.15	< 0.05	< 0.05
<b>Arsenic (filtered)</b>						
Arsenic (filtered)	0.001	mg/L	0.003	0.004	< 0.001	0.014
<b>Cadmium (filtered)</b>						
Cadmium (filtered)	0.0002	mg/L	< 0.0002	0.0005	< 0.0002	< 0.0002
<b>Chromium (filtered)</b>						
Chromium (filtered)	0.001	mg/L	< 0.001	0.002	0.001	< 0.001
<b>Copper (filtered)</b>						
Copper (filtered)	0.001	mg/L	0.004	0.009	0.005	0.009
<b>Iron (filtered)</b>						
Iron (filtered)	0.05	mg/L	72	7.5	3.2	78
<b>Lead (filtered)</b>						
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
<b>Mercury (filtered)</b>						
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
<b>Nickel (filtered)</b>						
Nickel (filtered)	0.001	mg/L	0.019	0.013	0.009	0.066
<b>Zinc (filtered)</b>						
Zinc (filtered)	0.005	mg/L	0.009	0.009	0.024	0.096

Client Sample ID			MW307R	MW308R
Sample Matrix			Water	Water
Eurofins Sample No.			N23-De0040734	N23-De0040735
Date Sampled			Dec 18, 2023	Dec 18, 2023
Test/Reference	LOR	Unit		
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>				
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1



Client Sample ID			MW307R	MW308R
Sample Matrix			Water	Water
Eurofins Sample No.			N23-De0040734	N23-De0040735
Date Sampled			Dec 18, 2023	Dec 18, 2023
Test/Reference	LOR	Unit		
<b>BTEX</b>				
Benzene	0.001	mg/L	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	66	67
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>				
Naphthalene <sup>N02</sup>	0.01	mg/L	< 0.01	< 0.01
TRH >C10-C16 less Naphthalene (F2) <sup>N01</sup>	0.05	mg/L	< 0.05	< 0.05
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1) <sup>N04</sup>	0.02	mg/L	< 0.02	< 0.02
<b>Polycyclic Aromatic Hydrocarbons</b>				
Acenaphthene	0.001	mg/L	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001
Benzo(b&j)fluoranthene <sup>N07</sup>	0.001	mg/L	< 0.001	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001
Indeno(1,2,3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	51	51
p-Terphenyl-d14 (surr.)	1	%	94	106
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>				
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1
<b>Ammonia and Nitrogen</b>				
Ammonia (as N)	0.01	mg/L	32	1.3
Biochemical Oxygen Demand (BOD-5 Day)	2	mg/L	6.5	< 10
Conductivity (at 25 °C)	10	uS/cm	38000	7100
Nitrate & Nitrite (as N)	0.05	mg/L	0.26	< 0.05
Nitrate (as N)	0.02	mg/L	0.26	< 0.02
Nitrite (as N)	0.02	mg/L	< 0.02	< 0.02
pH (at 25 °C)	0.1	pH Units	7.6	6.9
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	31	2.0
Total Nitrogen (as N)*	0.2	mg/L	31	2.0
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	13	130

Client Sample ID			MW307R	MW308R
Sample Matrix			Water	Water
Eurofins Sample No.			N23-De0040734	N23-De0040735
Date Sampled			Dec 18, 2023	Dec 18, 2023
Test/Reference	LOR	Unit		
Turbidity	1	NTU	4.9	920
Thermotolerant Coliforms	1	CFU/100mL	506	M23b6
Phosphate total (as P)	0.01	mg/L	8.0	0.05
<b>Heavy Metals</b>				
Aluminium (filtered)	0.05	mg/L	< 0.05	< 0.05
Arsenic (filtered)	0.001	mg/L	0.001	0.005
Cadmium (filtered)	0.0002	mg/L	0.0004	< 0.0002
Chromium (filtered)	0.001	mg/L	0.002	< 0.001
Copper (filtered)	0.001	mg/L	0.004	0.002
Iron (filtered)	0.05	mg/L	0.18	49
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	< 0.001	0.006
Zinc (filtered)	0.005	mg/L	< 0.005	< 0.005

**Sample History**

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

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

Description	Testing Site	Extracted	Holding Time
<b>Eurofins Suite B4</b>			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Jan 03, 2024	7 Days
BTEX - Method: LTM-ORG-2010 BTEX and Volatile TRH	Sydney	Dec 18, 2023	14 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Dec 18, 2023	7 Days
Polycyclic Aromatic Hydrocarbons - Method: LTM-ORG-2130 PAH and Phenols in Soil and Water	Sydney	Jan 03, 2024	7 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Jan 03, 2024	7 Days
Ammonia (as N) - Method: LTM-INO-4450 Determination of Nitrogen Species by Discrete Analyser	Melbourne	Dec 19, 2023	28 Days
Biochemical Oxygen Demand (BOD-5 Day) - Method: LTM-INO-4010 Biochemical Oxygen Demand (BOD5) in Water	Sydney	Jan 03, 2024	2 Days
Conductivity (at 25 °C) - Method: LTM-INO-4030 Conductivity	Newcastle	Dec 18, 2023	28 Days
pH (at 25 °C) - Method: LTM-GEN-7090 pH by ISE	Newcastle	Dec 18, 2023	0 Day
Total Suspended Solids Dried at 103 °C to 105 °C - Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry	Newcastle	Dec 18, 2023	7 Days
Turbidity - Method: LTM-INO-4140 Turbidity by Nephelometric Method	Sydney	Jan 03, 2024	2 Days
Phosphate total (as P) - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Melbourne	Jan 11, 2024	28 Days
Thermotolerant Coliforms - Method: AS 4276.5 (in-house method LTM-MIC-6010)	Newcastle	Dec 18, 2023	24 Hours
Heavy Metals (filtered) - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Jan 03, 2024	180 Days
Metals M8 filtered - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Jan 03, 2024	28 Days
<b>Total Nitrogen Set (as N)</b>			
Nitrate & Nitrite (as N) - Method: LTM-INO-4450 Determination of Nitrogen Species by Discrete Analyser	Melbourne	Dec 19, 2023	28 Days
Nitrate (as N) - Method: LTM-INO-4450 Determination of Nitrogen Species by Discrete Analyser	Melbourne	Dec 19, 2023	28 Days
Nitrite (as N) - Method: LTM-INO-4450 Determination of Nitrogen Species by Discrete Analyser	Melbourne	Dec 19, 2023	2 Days
Total Kjeldahl Nitrogen (as N) - Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA	Melbourne	Dec 19, 2023	28 Days
<b>Eurofins Suite B19A: Total N (TKN, NOx), Total P</b>			
Phosphate total (as P) - Method: E052 Total Phosphate (as P)	Sydney	Jan 03, 2024	28 Days

<b>Melbourne</b> 6 Monterey Road Dandenong South VIC 3175 +61 3 8564 5000 NATA# 1261 Site# 1254	<b>Geelong</b> 19/8 Lewalan Street Grovedale VIC 3216 +61 3 8564 5000 NATA# 1261 Site# 25403	<b>Sydney</b> 179 Magowar Road Girraween NSW 2145 +61 2 9900 8400 NATA# 1261 Site# 18217	<b>Canberra</b> Unit 1,2 Dacre Street Mitchell ACT 2911 +61 2 6113 8091 NATA# 1261 Site# 25466	<b>Brisbane</b> 1/21 Smallwood Place Murarie QLD 4172 T: +61 7 3902 4600 NATA# 1261 Site# 20794	<b>Newcastle</b> 1/2 Frost Drive Mayfield West NSW 2304 +61 2 4968 8448 NATA# 1261 Site# 25079 & 25289	<b>Perth</b> 46-48 Banksia Road Welshpool WA 6106 +61 8 6253 4444 NATA# 2377 Site# 2370	<b>Auckland</b> 35 O'Rorke Road Penrose, Auckland 1061 +64 9 526 4551 IANZ# 1327	<b>Auckland (Asb)</b> Unit C1/4 Pacific Rise, Mount Wellington, Auckland 1061 +64 9 525 0568 IANZ# 1308	<b>Christchurch</b> 43 Detroit Drive Rolleston, Christchurch 7675 +64 3 343 5201 IANZ# 1290	<b>Tauranga</b> 1277 Cameron Road, Gate Pa, Tauranga 3112 +64 9 525 0568 IANZ# 1402
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<b>Company Name:</b> GHD Pty Ltd NEWCASTLE	<b>Order No.:</b> 1611010	<b>Received:</b> Dec 18, 2023 12:40 PM
<b>Address:</b> 3/24 Honeysuckle Dve Newcastle NSW 2300	<b>Report #:</b> 1054805	<b>Due:</b> Jan 3, 2024
	<b>Phone:</b> 02 4979 9999	<b>Priority:</b> 10 Day
	<b>Fax:</b> 02 4979 9988	<b>Contact Name:</b> Leslie Maranciak
<b>Project Name:</b> AURIZON HEXHAM WATER MONITORING		
<b>Project ID:</b> 1611010		

**Eurofins Analytical Services Manager : Andrew Black**

Sample Detail						Aluminium (filtered)	Ammonia (as N)	Biochemical Oxygen Demand (BOD-5 Day)	Conductivity (at 25 °C)	Iron (filtered)	pH (at 25 °C)	Phosphate total (as P)	Thermotolerant Coliforms	Total Suspended Solids Dried at 103 °C to 105 °C	Turbidity	Metals M8 filtered	Eurofins Suite B4	Eurofins Suite B19A: Total N (TKN, NOx), Total P
<b>Melbourne Laboratory - NATA # 1261 Site # 1254</b>							X					X					X	X
<b>Sydney Laboratory - NATA # 1261 Site # 18217</b>						X		X		X					X	X	X	X
<b>Mayfield Laboratory - NATA # 1261 Site # 25079 &amp; 25289</b>									X		X	X	X					
<b>External Laboratory</b>																		
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID													
1	MW01R	Dec 18, 2023		Water	N23-De0040730	X	X	X	X	X	X	X	X	X	X	X	X	X
2	MW101R	Dec 18, 2023		Water	N23-De0040731	X	X	X	X	X	X	X	X	X	X	X	X	X
3	MW108R	Dec 18, 2023		Water	N23-De0040732	X	X	X	X	X	X	X	X	X	X	X	X	X
4	MW02	Dec 18, 2023		Water	N23-De0040733	X	X	X	X	X	X	X	X	X	X	X	X	X
5	MW307R	Dec 18, 2023		Water	N23-De0040734	X	X	X	X	X	X	X	X	X	X	X	X	X
6	MW308R	Dec 18, 2023		Water	N23-De0040735	X	X	X	X	X	X	X	X	X	X	X	X	X
<b>Test Counts</b>						6	6	6	6	6	6	1	6	6	6	6	6	6

## Internal Quality Control Review and Glossary

### General

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

### Holding Times

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

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

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

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

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

### Units

<b>mg/kg:</b> milligrams per kilogram	<b>mg/L:</b> milligrams per litre	<b>ppm:</b> parts per million
<b>µg/L:</b> micrograms per litre	<b>ppb:</b> parts per billion	<b>%:</b> Percentage
<b>org/100 mL:</b> Organisms per 100 millilitres	<b>NTU:</b> Nephelometric Turbidity Units	<b>MPN/100 mL:</b> Most Probable Number of organisms per 100 millilitres
<b>CFU:</b> Colony forming unit	<b>Colour:</b> Pt-Co Units	

### Terms

<b>APHA</b>	American Public Health Association
<b>CEC</b>	Cation Exchange Capacity
<b>COC</b>	Chain of Custody
<b>CP</b>	Client Parent - QC was performed on samples pertaining to this report
<b>CRM</b>	Certified Reference Material (ISO17034) - reported as percent recovery.
<b>Dry</b>	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
<b>Duplicate</b>	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
<b>LOR</b>	Limit of Reporting.
<b>LCS</b>	Laboratory Control Sample - reported as percent recovery.
<b>Method Blank</b>	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
<b>NCP</b>	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
<b>RPD</b>	Relative Percent Difference between two Duplicate pieces of analysis.
<b>SPIKE</b>	Addition of the analyte to the sample and reported as percentage recovery.
<b>SRA</b>	Sample Receipt Advice
<b>Surr - Surrogate</b>	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
<b>TBTO</b>	Tributyltin oxide ( <i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
<b>TCLP</b>	Toxicity Characteristic Leaching Procedure
<b>TEQ</b>	Toxic Equivalency Quotient or Total Equivalence
<b>QSM</b>	US Department of Defense Quality Systems Manual Version 5.4
<b>US EPA</b>	United States Environmental Protection Agency
<b>WA DWER</b>	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

### QC - Acceptance Criteria

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

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

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

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

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 70 – 130%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 5.4, where no positive PFAS results have been reported or reviewed, and no data was affected.

### QC Data General Comments

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

**Quality Control Results**

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Method Blank</b>							
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
<b>Method Blank</b>							
<b>BTEX</b>							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total*	mg/L	< 0.003			0.003	Pass	
<b>Method Blank</b>							
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>							
Naphthalene	mg/L	< 0.01			0.01	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
<b>Method Blank</b>							
<b>Polycyclic Aromatic Hydrocarbons</b>							
Acenaphthene	mg/L	< 0.001			0.001	Pass	
Acenaphthylene	mg/L	< 0.001			0.001	Pass	
Anthracene	mg/L	< 0.001			0.001	Pass	
Benz(a)anthracene	mg/L	< 0.001			0.001	Pass	
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.001			0.001	Pass	
Benzo(g,h,i)perylene	mg/L	< 0.001			0.001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.001			0.001	Pass	
Chrysene	mg/L	< 0.001			0.001	Pass	
Dibenz(a,h)anthracene	mg/L	< 0.001			0.001	Pass	
Fluoranthene	mg/L	< 0.001			0.001	Pass	
Fluorene	mg/L	< 0.001			0.001	Pass	
Indeno(1,2,3-cd)pyrene	mg/L	< 0.001			0.001	Pass	
Naphthalene	mg/L	< 0.001			0.001	Pass	
Phenanthrene	mg/L	< 0.001			0.001	Pass	
Pyrene	mg/L	< 0.001			0.001	Pass	
<b>Method Blank</b>							
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>							
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
<b>Method Blank</b>							
Ammonia (as N)	mg/L	< 0.01			0.01	Pass	
Nitrate & Nitrite (as N)	mg/L	< 0.05			0.05	Pass	
Nitrite (as N)	mg/L	< 0.02			0.02	Pass	
Total Kjeldahl Nitrogen (as N)	mg/L	< 0.2			0.2	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	mg/L	< 5			5	Pass	
Turbidity	NTU	< 1			1	Pass	
Phosphate total (as P)	mg/L	< 0.01			0.01	Pass	
<b>LCS - % Recovery</b>							
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>							
TRH C6-C9	%	90			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code	
TRH C10-C14	%	73			70-130	Pass		
<b>LCS - % Recovery</b>								
<b>BTEX</b>								
Benzene	%	92			70-130	Pass		
Toluene	%	104			70-130	Pass		
Ethylbenzene	%	101			70-130	Pass		
m&p-Xylenes	%	102			70-130	Pass		
o-Xylene	%	102			70-130	Pass		
Xylenes - Total*	%	102			70-130	Pass		
<b>LCS - % Recovery</b>								
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>								
Naphthalene	%	90			70-130	Pass		
TRH C6-C10	%	91			70-130	Pass		
<b>LCS - % Recovery</b>								
<b>Polycyclic Aromatic Hydrocarbons</b>								
Acenaphthene	%	113			70-130	Pass		
Acenaphthylene	%	116			70-130	Pass		
Anthracene	%	123			70-130	Pass		
Benz(a)anthracene	%	111			70-130	Pass		
Benzo(a)pyrene	%	113			70-130	Pass		
Benzo(b&j)fluoranthene	%	117			70-130	Pass		
Benzo(g,h,i)perylene	%	124			70-130	Pass		
Benzo(k)fluoranthene	%	116			70-130	Pass		
Chrysene	%	118			70-130	Pass		
Dibenz(a,h)anthracene	%	119			70-130	Pass		
Fluoranthene	%	112			70-130	Pass		
Fluorene	%	116			70-130	Pass		
Indeno(1,2,3-cd)pyrene	%	117			70-130	Pass		
Naphthalene	%	98			70-130	Pass		
Phenanthrene	%	112			70-130	Pass		
Pyrene	%	114			70-130	Pass		
<b>LCS - % Recovery</b>								
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>								
TRH >C10-C16	%	70			70-130	Pass		
<b>LCS - % Recovery</b>								
Ammonia (as N)	%	113			70-130	Pass		
Conductivity (at 25 °C)	%	97			70-130	Pass		
Nitrate & Nitrite (as N)	%	116			70-130	Pass		
Nitrite (as N)	%	105			70-130	Pass		
Total Kjeldahl Nitrogen (as N)	%	75			70-130	Pass		
Total Suspended Solids Dried at 103 °C to 105 °C	%	105			70-130	Pass		
Turbidity	%	105			70-130	Pass		
Phosphate total (as P)	%	95			70-130	Pass		
Test	Lab Sample ID	QA Source	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
<b>Spike - % Recovery</b>								
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>				Result 1				
TRH C6-C9	N23-De0036559	NCP	%	89		70-130	Pass	
TRH C10-C14	S23-De0046071	NCP	%	82		70-130	Pass	
<b>Spike - % Recovery</b>								
<b>BTEX</b>				Result 1				
Benzene	N23-De0036559	NCP	%	107		70-130	Pass	
Toluene	N23-De0036559	NCP	%	110		70-130	Pass	
Ethylbenzene	N23-De0036559	NCP	%	105		70-130	Pass	
m&p-Xylenes	N23-De0036559	NCP	%	104		70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
o-Xylene	N23-De0036559	NCP	%	103			70-130	Pass	
Xylenes - Total*	N23-De0036559	NCP	%	104			70-130	Pass	
<b>Spike - % Recovery</b>									
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>				Result 1					
Naphthalene	N23-De0036559	NCP	%	92			70-130	Pass	
TRH C6-C10	N23-De0036559	NCP	%	88			70-130	Pass	
<b>Spike - % Recovery</b>									
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>				Result 1					
TRH >C10-C16	S23-De0046071	NCP	%	76			70-130	Pass	
<b>Spike - % Recovery</b>									
				Result 1					
Nitrate & Nitrite (as N)	N23-De0040730	CP	%	82			70-130	Pass	
Nitrite (as N)	B23-De0041643	NCP	%	106			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	M23-De0044625	NCP	%	85			70-130	Pass	
Phosphate total (as P)	B23-De0030177	NCP	%	102			70-130	Pass	
<b>Spike - % Recovery</b>									
<b>Heavy Metals</b>				Result 1					
Aluminium (filtered)	S23-De0056069	NCP	%	91			75-125	Pass	
Arsenic (filtered)	S23-De0056069	NCP	%	95			75-125	Pass	
Cadmium (filtered)	S23-De0056069	NCP	%	83			75-125	Pass	
Chromium (filtered)	S23-De0056069	NCP	%	87			75-125	Pass	
Copper (filtered)	S23-De0056069	NCP	%	81			75-125	Pass	
Lead (filtered)	S23-De0056069	NCP	%	84			75-125	Pass	
Mercury (filtered)	S23-De0047834	NCP	%	96			75-125	Pass	
Nickel (filtered)	S23-De0056069	NCP	%	81			75-125	Pass	
Zinc (filtered)	S23-De0056069	NCP	%	80			75-125	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Duplicate</b>									
<b>Total Recoverable Hydrocarbons - 1999 NEPM Fractions</b>				Result 1	Result 2	RPD			
TRH C6-C9	N23-De0040730	CP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C10-C14	N23-De0040730	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	N23-De0040730	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	N23-De0040730	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
<b>Duplicate</b>									
<b>BTEX</b>				Result 1	Result 2	RPD			
Benzene	N23-De0040730	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Toluene	N23-De0040730	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Ethylbenzene	N23-De0040730	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
m&p-Xylenes	N23-De0040730	CP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
o-Xylene	N23-De0040730	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Xylenes - Total*	N23-De0040730	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
<b>Duplicate</b>									
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>				Result 1	Result 2	RPD			
Naphthalene	N23-De0040730	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
TRH C6-C10	N23-De0040730	CP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
<b>Duplicate</b>									
<b>Polycyclic Aromatic Hydrocarbons</b>				Result 1	Result 2	RPD			
Acenaphthene	S23-De0053772	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Acenaphthylene	S23-De0053772	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Anthracene	S23-De0053772	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benz(a)anthracene	S23-De0053772	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(a)pyrene	S23-De0053772	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(b&j)fluoranthene	S23-De0053772	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(g,h,i)perylene	S23-De0053772	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	



Duplicate								
<b>Polycyclic Aromatic Hydrocarbons</b>				Result 1	Result 2	RPD		
Benzo(k)fluoranthene	S23-De0053772	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Chrysene	S23-De0053772	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Dibenz(a,h)anthracene	S23-De0053772	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Fluoranthene	S23-De0053772	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Fluorene	S23-De0053772	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Indeno(1.2.3-cd)pyrene	S23-De0053772	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Naphthalene	S23-De0053772	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Phenanthrene	S23-De0053772	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Pyrene	S23-De0053772	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Duplicate								
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>				Result 1	Result 2	RPD		
TRH >C10-C16	N23-De0040730	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass
TRH >C16-C34	N23-De0040730	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass
TRH >C34-C40	N23-De0040730	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Ammonia (as N)	M23-De0039259	NCP	mg/L	0.14	0.14	4.6	30%	Pass
Nitrate & Nitrite (as N)	M23-De0039259	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass
Nitrate (as N)	M23-De0039259	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass
Nitrite (as N)	M23-De0039259	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass
Turbidity	N23-De0040730	CP	NTU	950	950	<1	30%	Pass
Phosphate total (as P)	B23-De0041641	NCP	mg/L	0.01	0.02	29	30%	Pass
Duplicate								
<b>Heavy Metals</b>				Result 1	Result 2	RPD		
Aluminium (filtered)	N24-Ja0000039	NCP	mg/L	0.26	0.25	4.8	30%	Pass
Arsenic (filtered)	N24-Ja0000039	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Cadmium (filtered)	N24-Ja0000039	NCP	mg/L	0.0002	0.0002	<1	30%	Pass
Chromium (filtered)	N24-Ja0000039	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Copper (filtered)	N24-Ja0000039	NCP	mg/L	60	60	<1	30%	Pass
Iron (filtered)	S24-Ja0000632	NCP	mg/L	< 0.05	0.33	<1	30%	Pass
Lead (filtered)	N24-Ja0000039	NCP	mg/L	0.002	0.002	3.8	30%	Pass
Mercury (filtered)	N24-Ja0000039	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Nickel (filtered)	N24-Ja0000039	NCP	mg/L	0.007	0.007	<1	30%	Pass
Zinc (filtered)	N24-Ja0000039	NCP	mg/L	0.47	0.46	1.2	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Total Kjeldahl Nitrogen (as N)	N23-De0040731	CP	mg/L	2.9	2.4	17	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Conductivity (at 25 °C)	N23-De0040735	CP	uS/cm	7100	7100	<1	30%	Pass
pH (at 25 °C)	N23-De0040735	CP	pH Units	6.9	6.9	pass	30%	Pass
Total Suspended Solids Dried at 103 °C to 105 °C	N23-De0040735	CP	mg/L	130	120	12	30%	Pass

**Comments**
**Sample Integrity**

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

**Qualifier Codes/Comments**

Code	Description
M23a	AS 4276.1:2021 Water microbiology, Method 1: Water quality - General requirements and guidance for microbiological examinations by culture. For 1 or 2 colonies the result is reported as "Presence"
M23b	AS 4276.1:2021 Water microbiology, Method 1: Water quality - General requirements and guidance for microbiological examinations by culture. For 3 to 9 colonies, the result is reported as "Estimate"
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs

**Authorised by:**

Ursula Long	Analytical Services Manager
Charl Du Preez	Senior Analyst-Inorganic
Kirra Bailey	Senior Analyst-Inorganic
Kirra Bailey	Senior Analyst-Microbiology
Mary Makarios	Senior Analyst-Inorganic
Mary Makarios	Senior Analyst-Metal
Mickael Ros	Senior Analyst-Metal
Roopesh Rangarajan	Senior Analyst-Organic
Roopesh Rangarajan	Senior Analyst-Volatile
Ryan Phillips	Senior Analyst-Inorganic



**Glenn Jackson**  
**Managing Director**

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

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

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

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## Sample Receipt Advice

<b>Company name:</b>	GHD Pty Ltd NEWCASTLE
<b>Contact name:</b>	Leslie Maranciak
<b>Project name:</b>	AURIZON HEXHAM WATER MONITORING
<b>Project ID:</b>	1611010
<b>Turnaround time:</b>	10 Day
<b>Date/Time received</b>	Dec 18, 2023 12:40 PM
<b>Eurofins reference</b>	1054805

## Sample Information

- ✓ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ✓ Sample Temperature of chilled sample on the batch as recorded by Eurofins Sample Receipt : 17.3 degrees Celsius.
- ✓ All samples have been received as described on the above COC.
- ✓ COC has been completed correctly.
- ✓ Attempt to chill was evident.
- ✓ Appropriately preserved sample containers have been used.
- ✓ All samples were received in good condition.
- ✓ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ✓ Appropriate sample containers have been used.
- ✓ Sample containers for volatile analysis received with zero headspace.
- ✗ Split sample sent to requested external lab.
- ✗ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

## Notes

## Contact

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

**Andrew Black on phone : (+61) 2 9900 8490 or by email: AndrewBlack@eurofins.com**

Results will be delivered electronically via email to Leslie Maranciak - leslie.maranciak@ghd.com.

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

**CHAIN OF CUSTODY RECORD**

<b>CLIENT DETAILS</b>		Page _____ of _____	
Company Name : <b>GHD</b>	Contact Name : <b>Nina Foley</b>	Purchase Order : <b>12611010</b>	COC Number :
Office Address : <b>L3, 24 Honeysuckle Drive</b>	Project Manager : <b>Leslie Maranciak</b>	PROJECT Number : <b>12611010</b>	Eurofins   mgt quote ID : <b>180501GHD</b>
<b>Newcastle 2300</b>	Email for results : <b>ghdlabreports@ghd.com</b> <b>Lachlan.Parkinson@ghd.com</b> <b>nina.foley@ghd.com</b>	PROJECT Name : <b>Aurizon Hexham Water Monitoring</b>	Data output format: <b>ESDAT</b>

**Special Directions & Comments :**  
**Please ensure fecal coliforms are reported in CFU/100ml**

Analytes		Some common holding times (with correct preservation). For further information contact the lab	
B4 (BTEXN / TRH / PAH) Dissolved Metals (Al, As, Cd, Cr, Cu, Fe, Pb, Hg, Ni, Zn) pH, Conductivity, Turbidity, Suspended Solids Ammonia Suite B19A (Nutrients: Total N (TKN), NOX), Total P Thermotolerant Coliforms (CFU/100ml) BOD 5 Day	Send to ALS - same analysis as F001 at ALS please	<b>Waters</b>	<b>Soils</b>
		BTEX, MAH, VOC TRH, PAH, Phenols, Pesticides Heavy Metals Mercury, CrVI Microbiological testing BOD, Nitrate, Nitrite, Total N Solids - TSS, TDS etc Ferrous iron	14 days 7 days 6 months 28 days 24 hours 2 days 7 days 7 days

Eurofins | mgt DI water batch number:

Sample ID	Date	Matrix	B4 (BTEXN / TRH / PAH)	Dissolved Metals (Al, As, Cd, Cr, Cu, Fe, Pb, Hg, Ni, Zn)	pH, Conductivity, Turbidity, Suspended Solids	Ammonia	Suite B19A (Nutrients: Total N (TKN), NOX), Total P	Thermotolerant Coliforms (CFU/100ml)	BOD 5 Day	Send to ALS - same analysis as F001 at ALS please
1 MW01R		W	X	X	X	X	X	X	X	
2		W	X	X	X	X	X	X	X	
3		W	X	X	X	X	X	X	X	
4		W	X	X	X	X	X	X	X	
5 MW106R		W	X	X	X	X	X	X	X	
6		W	X	X	X	X	X	X	X	
7		W	X	X	X	X	X	X	X	
8 MW02		W	X	X	X	X	X	X	X	
9 MW307R		W	X	X	X	X	X	X	X	
10 MW308R		W	X	X	X	X	X	X	X	
11		W	X	X	X	X	X	X	X	
12		W	X	X			X			
13		W								
14		W	X	X			X			X
16										
16										
17										

Containers:							Sample comments:
1LP	250P	125P	1LA	40mL vial	125mL A	Jar	

Relinquished By: <b>N. Foley</b>	Laboratory Staff: <b>Standa</b>	Turn around time: 1 DAY <input type="checkbox"/> 2 DAY <input type="checkbox"/> 3 DAY <input type="checkbox"/> 5 DAY <input checked="" type="checkbox"/> 10 DAY <input type="checkbox"/> Other:	Method Of Shipment: <input type="checkbox"/> Courier <input type="checkbox"/> Hand Delivered <input type="checkbox"/> Postal	Temperature on arrival: <b>17.3</b>
Date & Time: <b>18/12/13 1:00pm</b>	Date & Time: <b>18/12 100</b>	Signature: <i>[Signature]</i>	Courier Consignment # :	Report number: <b>1054805</b>



## CERTIFICATE OF ANALYSIS

Work Order	: <b>ES2343916</b>	Page	: 1 of 6
Client	: <b>GHD PTY LTD</b>	Laboratory	: Environmental Division Sydney
Contact	: LACHLAN PARKINSON	Contact	: Sarah Mathew
Address	: Level 3, GHD Tower, 24 Honeysuckle Drive Newcastle 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: 12611010	Date Samples Received	: 15-Dec-2023 12:00
Order number	: ----	Date Analysis Commenced	: 19-Dec-2023
C-O-C number	: ----	Issue Date	: 28-Dec-2023 17:05
Sampler	: ----		
Site	:		
Quote number	: EN/000		
No. of samples received	: 1		
No. of samples analysed	: 1		



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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW



## General Comments

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

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

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

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

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

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

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

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



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	FD02	----	----	----	----
Sampling date / time				13-Dec-2023 00:00	----	----	----	----	
Compound	CAS Number	LOR	Unit	ES2343916-001	-----	-----	-----	-----	
				Result	---	---	---	---	
<b>EG020F: Dissolved Metals by ICP-MS</b>									
Aluminium	7429-90-5	0.01	mg/L	0.01	----	----	----	----	
Arsenic	7440-38-2	0.001	mg/L	0.003	----	----	----	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	----	----	----	----	
Chromium	7440-47-3	0.001	mg/L	0.001	----	----	----	----	
Copper	7440-50-8	0.001	mg/L	0.001	----	----	----	----	
Lead	7439-92-1	0.001	mg/L	<0.001	----	----	----	----	
Nickel	7440-02-0	0.001	mg/L	0.010	----	----	----	----	
Zinc	7440-66-6	0.005	mg/L	0.093	----	----	----	----	
Iron	7439-89-6	0.05	mg/L	103	----	----	----	----	
<b>EG035F: Dissolved Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----	
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	----	----	----	----	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	3.0	----	----	----	----	
<b>EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser</b>									
^ Total Nitrogen as N	----	0.1	mg/L	3.0	----	----	----	----	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L	0.54	----	----	----	----	
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons</b>									
Naphthalene	91-20-3	1.0	µg/L	<1.0	----	----	----	----	
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	----	----	----	----	
Acenaphthene	83-32-9	1.0	µg/L	<1.0	----	----	----	----	
Fluorene	86-73-7	1.0	µg/L	<1.0	----	----	----	----	
Phenanthrene	85-01-8	1.0	µg/L	<1.0	----	----	----	----	
Anthracene	120-12-7	1.0	µg/L	<1.0	----	----	----	----	
Fluoranthene	206-44-0	1.0	µg/L	<1.0	----	----	----	----	



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	FD02	----	----	----	----
Sampling date / time				13-Dec-2023 00:00	----	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2343916-001	-----	-----	-----	-----	-----
				Result	---	---	---	---	---
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued</b>									
Pyrene	129-00-0	1.0	µg/L	<1.0	----	----	----	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	----	----	----	----	----
Chrysene	218-01-9	1.0	µg/L	<1.0	----	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L	<1.0	----	----	----	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	----	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	----	----	----	----	----
Dibenz(a,h)anthracene	53-70-3	1.0	µg/L	<1.0	----	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	1.0	µg/L	<1.0	----	----	----	----	----
<sup>^</sup> Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	----	----	----	----	----
<sup>^</sup> Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	<0.5	----	----	----	----	----
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----	----
C10 - C14 Fraction	----	50	µg/L	<50	----	----	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	----	----	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----	----
<sup>^</sup> C10 - C36 Fraction (sum)	----	50	µg/L	<50	----	----	----	----	----
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	----	----	----
<sup>^</sup> C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----	----
>C10 - C16 Fraction	----	100	µg/L	<100	----	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	----	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----	----
<sup>^</sup> >C10 - C40 Fraction (sum)	----	100	µg/L	<100	----	----	----	----	----
<sup>^</sup> >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	----	----	----	----	----
<b>EP080: BTEXN</b>									





## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	FD02	----	----	----	----
Sampling date / time				13-Dec-2023 00:00	----	----	----	----	
Compound	CAS Number	LOR	Unit	ES2343916-001	-----	-----	-----	-----	
				Result	---	---	---	---	
<b>EP080: BTEXN - Continued</b>									
Benzene	71-43-2	1	µg/L	<1	----	----	----	----	
Toluene	108-88-3	2	µg/L	<2	----	----	----	----	
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----	
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----	
^ Total Xylenes	----	2	µg/L	<2	----	----	----	----	
^ Sum of BTEX	----	1	µg/L	<1	----	----	----	----	
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----	
<b>EP075(SIM)S: Phenolic Compound Surrogates</b>									
Phenol-d6	13127-88-3	1.0	%	28.6	----	----	----	----	
2-Chlorophenol-D4	93951-73-6	1.0	%	55.4	----	----	----	----	
2.4.6-Tribromophenol	118-79-6	1.0	%	56.7	----	----	----	----	
<b>EP075(SIM)T: PAH Surrogates</b>									
2-Fluorobiphenyl	321-60-8	1.0	%	62.5	----	----	----	----	
Anthracene-d10	1719-06-8	1.0	%	73.1	----	----	----	----	
4-Terphenyl-d14	1718-51-0	1.0	%	78.0	----	----	----	----	
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
1.2-Dichloroethane-D4	17060-07-0	2	%	107	----	----	----	----	
Toluene-D8	2037-26-5	2	%	113	----	----	----	----	
4-Bromofluorobenzene	460-00-4	2	%	119	----	----	----	----	



## Surrogate Control Limits

Sub-Matrix: WATER		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	72	143
Toluene-D8	2037-26-5	75	131
4-Bromofluorobenzene	460-00-4	73	137



## QUALITY CONTROL REPORT

Work Order	: <b>ES2343916</b>	Page	: 1 of 6
Client	: <b>GHD PTY LTD</b>	Laboratory	: Environmental Division Sydney
Contact	: LACHLAN PARKINSON	Contact	: Sarah Mathew
Address	: Level 3, GHD Tower, 24 Honeysuckle Drive Newcastle 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: 12611010	Date Samples Received	: 15-Dec-2023
Order number	: ----	Date Analysis Commenced	: 19-Dec-2023
C-O-C number	: ----	Issue Date	: 28-Dec-2023
Sampler	: ----		
Site	:		
Quote number	: EN/000		
No. of samples received	: 1		
No. of samples analysed	: 1		



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
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW



## General Comments

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

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

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

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

\* = The final LOR has been raised due to dilution or other sample specific cause; adjusted LOR is shown in brackets. The duplicate ranges for Acceptable RPD% are applied to the final LOR where applicable.

## Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
<b>EG020F: Dissolved Metals by ICP-MS (QC Lot: 5511385)</b>									
ES2343916-001	FD02	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.003	0.003	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.010	0.011	0.0	0% - 50%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.093	0.101	8.3	0% - 20%
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.01	0.01	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05 (1.00)*	mg/L	103	112	8.8	0% - 20%
ES2344002-020	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001 (0.0010)*	mg/L	0.0023	0.0028	19.6	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001 (0.010) *	mg/L	0.746	0.756	1.3	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001 (0.010) *	mg/L	0.128	0.134	4.5	0% - 50%
		EG020A-F: Copper	7440-50-8	0.001 (0.010) *	mg/L	0.497	0.540	8.4	0% - 20%
		EG020A-F: Lead	7439-92-1	0.001 (0.010) *	mg/L	<0.010	<0.010	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001 (0.010) *	mg/L	0.843	0.846	0.3	0% - 20%



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
<b>EG020F: Dissolved Metals by ICP-MS (QC Lot: 5511385) - continued</b>									
ES2344002-020	Anonymous	EG020A-F: Zinc	7440-66-6	0.005 (0.050) *	mg/L	0.733	0.772	5.2	0% - 50%
		EG020A-F: Aluminium	7429-90-5	0.01 (0.10)*	mg/L	<0.10	<0.10	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05 (0.10)*	mg/L	<0.10	<0.10	0.0	No Limit
<b>EG035F: Dissolved Mercury by FIMS (QC Lot: 5511386)</b>									
ES2344186-001	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 5511352)</b>									
ES2343532-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01 (0.10)*	mg/L	<0.10	<0.10	0.0	No Limit
ES2343532-010	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.35	0.35	0.0	0% - 20%
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 5511348)</b>									
ES2343532-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1 (0.2)*	mg/L	1.2	1.1	0.0	No Limit
ES2343532-011	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	<0.1	0.0	No Limit
<b>EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 5511347)</b>									
ES2343532-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.04	0.05	0.0	No Limit
ES2343532-011	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.05	0.04	0.0	No Limit
<b>EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5506324)</b>									
ES2343916-001	FD02	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
ES2344045-002	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5506324)</b>									
ES2343916-001	FD02	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES2344045-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
<b>EP080: BTEXN (QC Lot: 5506324)</b>									
ES2343916-001	FD02	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
ES2344045-002	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit



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

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

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
				Result	Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low	High
<b>EG020F: Dissolved Metals by ICP-MS (QCLot: 5511385)</b>								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	108	80.0	116
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	104	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	105	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	102	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	101	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	102	83.0	111
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	101	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	105	81.0	117
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	106	82.0	112
<b>EG035F: Dissolved Mercury by FIMS (QCLot: 5511386)</b>								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	89.0	83.0	105
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5511352)</b>								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	106	91.0	113
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5511348)</b>								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	98.6	69.0	101
				<0.1	1 mg/L	107	70.0	118
				<0.1	5 mg/L	105	70.0	130
<b>EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5511347)</b>								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	92.2	71.3	126
				<0.01	0.442 mg/L	91.7	71.3	126
				<0.01	1 mg/L	97.4	70.0	130
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 5500984)</b>								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	74.8	50.0	94.0
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	69.4	63.6	114
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	68.6	62.2	113
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	74.5	63.9	115
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	67.8	62.6	116
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	68.7	64.3	116
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	68.4	63.6	118
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	68.8	63.1	118



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
				Result	Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
						LCS	Low	High
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 5500984) - continued</b>								
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	66.7	64.1	117
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	70.1	62.5	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	5 µg/L	66.6	61.7	119
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	78.4	63.0	115
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	74.0	63.3	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	67.9	59.9	118
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	67.7	61.2	117
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	76.4	59.1	118
<b>EP080/071: Total Petroleum Hydrocarbons (QCLot: 5500985)</b>								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	75.0	53.7	97.0
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	84.2	63.3	107
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	93.9	58.3	120
<b>EP080/071: Total Petroleum Hydrocarbons (QCLot: 5506324)</b>								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	100	75.0	127
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5500985)</b>								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	75.8	53.9	95.5
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	73.3	57.8	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	89.8	50.5	115
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5506324)</b>								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	97.6	75.0	127
<b>EP080: BTEXN (QCLot: 5506324)</b>								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	105	68.3	119
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	100	73.5	120
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	107	73.8	122
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	115	73.0	122
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	108	76.4	123
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	98.7	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: **WATER**

Matrix Spike (MS) Report		
Spike	Spike Recovery(%)	Acceptable Limits (%)



Sub-Matrix: WATER

				Matrix Spike (MS) Report				
				Spike	SpikeRecovery(%)	Acceptable Limits (%)		
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High	
<b>EG020F: Dissolved Metals by ICP-MS (QCLot: 5511385)</b>								
ES2344001-001	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	106	70.0	130	
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	97.0	70.0	130	
		EG020A-F: Chromium	7440-47-3	1 mg/L	94.7	70.0	130	
		EG020A-F: Copper	7440-50-8	1 mg/L	96.6	70.0	130	
		EG020A-F: Lead	7439-92-1	1 mg/L	96.5	70.0	130	
		EG020A-F: Nickel	7440-02-0	1 mg/L	97.0	70.0	130	
		EG020A-F: Zinc	7440-66-6	1 mg/L	95.8	70.0	130	
<b>EG035F: Dissolved Mercury by FIMS (QCLot: 5511386)</b>								
ES2343916-001	FD02	EG035F: Mercury	7439-97-6	0.01 mg/L	97.0	70.0	130	
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 5511352)</b>								
ES2343532-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	5 mg/L	112	70.0	130	
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 5511348)</b>								
ES2343532-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	88.2	70.0	130	
<b>EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 5511347)</b>								
ES2343532-002	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	91.5	70.0	130	
<b>EP080/071: Total Petroleum Hydrocarbons (QCLot: 5506324)</b>								
ES2343916-001	FD02	EP080: C6 - C9 Fraction	----	325 µg/L	103	70.0	130	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5506324)</b>								
ES2343916-001	FD02	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	101	70.0	130	
<b>EP080: BTEXN (QCLot: 5506324)</b>								
ES2343916-001	FD02	EP080: Benzene	71-43-2	25 µg/L	104	70.0	130	
		EP080: Toluene	108-88-3	25 µg/L	99.5	70.0	130	
		EP080: Ethylbenzene	100-41-4	25 µg/L	107	70.0	130	
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	112	70.0	130	
			106-42-3					
		EP080: ortho-Xylene	95-47-6	25 µg/L	104	70.0	130	
	EP080: Naphthalene	91-20-3	25 µg/L	93.0	70.0	130		





## QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES2343916	Page	: 1 of 6
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: LACHLAN PARKINSON	Telephone	: +61-2-8784 8555
Project	: 12611010	Date Samples Received	: 15-Dec-2023
Site	:	Issue Date	: 28-Dec-2023
Sampler	: ----	No. of samples received	: 1
Order number	: ----	No. of samples analysed	: 1

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

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

### Summary of Outliers

#### Outliers : Quality Control Samples

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

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

#### Outliers : Analysis Holding Time Compliance

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

#### Outliers : Frequency of Quality Control Samples

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



### Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Method	Count		Rate (%)		Quality Control Specification
		QC	Regular	Actual	Expected	
<b>Laboratory Duplicates (DUP)</b>						
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	6	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	6	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
<b>Matrix Spikes (MS)</b>						
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	6	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	6	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

### Analysis Holding Time Compliance

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

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

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

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

Matrix: **WATER**

Evaluation: \* = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
<b>EG020F: Dissolved Metals by ICP-MS</b>							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F) FD02	13-Dec-2023	----	----	----	24-Dec-2023	10-Jun-2024	✓
<b>EG035F: Dissolved Mercury by FIMS</b>							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F) FD02	13-Dec-2023	----	----	----	27-Dec-2023	10-Jan-2024	✓
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>							
Clear Plastic Bottle - Sulfuric Acid (EK059G) FD02	13-Dec-2023	----	----	----	26-Dec-2023	10-Jan-2024	✓
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>							
Clear Plastic Bottle - Sulfuric Acid (EK061G) FD02	13-Dec-2023	22-Dec-2023	10-Jan-2024	✓	22-Dec-2023	10-Jan-2024	✓
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>							
Clear Plastic Bottle - Sulfuric Acid (EK067G) FD02	13-Dec-2023	22-Dec-2023	10-Jan-2024	✓	22-Dec-2023	10-Jan-2024	✓
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons</b>							
Amber Glass Bottle - Unpreserved (EP075(SIM)) FD02	13-Dec-2023	19-Dec-2023	20-Dec-2023	✓	21-Dec-2023	28-Jan-2024	✓



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
<b>EP080/071: Total Petroleum Hydrocarbons</b>							
Amber Glass Bottle - Unpreserved (EP071) FD02	13-Dec-2023	19-Dec-2023	20-Dec-2023	✔	21-Dec-2023	28-Jan-2024	✔
Clear glass VOC vial - HCl (EP080) FD02	13-Dec-2023	27-Dec-2023	27-Dec-2023	✔	27-Dec-2023	27-Dec-2023	✔
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>							
Amber Glass Bottle - Unpreserved (EP071) FD02	13-Dec-2023	19-Dec-2023	20-Dec-2023	✔	21-Dec-2023	28-Jan-2024	✔
Clear glass VOC vial - HCl (EP080) FD02	13-Dec-2023	27-Dec-2023	27-Dec-2023	✔	27-Dec-2023	27-Dec-2023	✔
<b>EP080: BTEXN</b>							
Clear glass VOC vial - HCl (EP080) FD02	13-Dec-2023	27-Dec-2023	27-Dec-2023	✔	27-Dec-2023	27-Dec-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: **WATER**

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

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
<b>Laboratory Duplicates (DUP)</b>							
Dissolved Mercury by FIMS	EG035F	1	2	50.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	14	14.29	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	6	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	6	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
<b>Laboratory Control Samples (LCS)</b>							
Dissolved Mercury by FIMS	EG035F	1	2	50.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	6	16.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	19	15.79	15.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	3	19	15.79	15.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	6	16.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
<b>Method Blanks (MB)</b>							
Dissolved Mercury by FIMS	EG035F	1	2	50.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	6	16.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	6	16.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
<b>Matrix Spikes (MS)</b>							
Dissolved Mercury by FIMS	EG035F	1	2	50.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	6	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	6	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



## Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl <sub>2</sub> )(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl <sub>2</sub> 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).
Nitrite and Nitrate as N (NO <sub>x</sub> ) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO <sub>3</sub> - F. Combined oxidised Nitrogen (NO <sub>2</sub> +NO <sub>3</sub> ) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)
Total Nitrogen as N (TKN + No <sub>x</sub> ) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO <sub>3</sub> -. This method is compliant with NEPM Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al, Zhang et al. This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015 The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270 Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260 Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM Schedule B(3)
Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)

Page : 6 of 6  
Work Order : ES2343916  
Client : GHD PTY LTD  
Project : 12611010



<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for purging.

**CHAIN OF CUSTODY RECORD**
**CLIENT DETAILS**

Company Name: <b>GHD</b>	Contact Name: <b>Lachlan Parkinson</b>	Purchase Order: <b>12611010</b>	Page <b>2</b> of <b>2</b>
Office Address: <b>L3, 24 Honeysuckle Drive Newcastle 2300</b>	Project Manager: <b>Leslie Maranciak</b>	PROJECT Number: <b>12611010</b>	GOC Number:
	Email for results: <b>Leslie.Maranciak@ghd.com Lachlan.Parkinson@ghd.com</b>	PROJECT Name: <b>Aurizon Hexham Water Monitoring</b>	Eurofins (mgt quote ID): <b>180501GHD</b>
			Date output format: <b>ESDAT</b>

**Special Directions & Comments**

Please ensure fecal coliforms are reported in CFU/100ml

Eurofins (mgt) Di water batch number:

**Analytes**

Some common holding times (with correct preservation)  
For further information contact the lab

**Waters**
**Soils**

Analyte	Waters	Soils
BTEX, MAH, VOC	14 days	BTEX, MAH, VOC
TRH, PAH, Phenols, Pesticides	7 days	TRH, PAH, Phenols, Pesticides
Heavy Metals	6 months	Heavy Metals
Mercury, CrVI	28 days	Mercury, CrVI
Microbiological testing	24 hours	Microbiological testing
BOD, Nitrate, Nitrite, Total N	2 days	Arsenic
Solids - TSS, TDS etc	7 days	SPOCAS, pH Field and FOX, GB
Ferrous ion	7 days	ASLP, TCLP

**Containers**

Sample ID	Matrix	94 (BTEXN / TRH / PAH)	Dissolved Metals (As, Cd, Cr, Cu, Fe, Pb, Hg, Ni, Zn)	pH, Conductivity, Turbidity, Suspended Solids	Ammonia	Total P	Total N	Total P	Thermotolerant Coliforms (CFU/100ml)	BOD 5 Day	Send to ALS - same analysis as F001 at ALS please	
21	MW101R	13/12/2023	W	X	X	X	X	X	X	X	X	
22	101R	13/12/2023	W	X	X	X	X	X	X	X	X	
23	MW101R	13/12/2023	W	X	X	X	X	X	X	X	X	
24	MW106R	13/12/2023	W	X	X	X	X	X	X	X	X	
25	MW107R	13/12/2023	W	X	X	X	X	X	X	X	X	
26	MW109	13/12/2023	W	X	X	X	X	X	X	X	X	
27	MW301R	13/12/2023	W	X	X	X	X	X	X	X	X	
28	MW60	13/12/2023	W	X	X	X	X	X	X	X	X	
29	MW620	13/12/2023	W	X	X	X	X	X	X	X	X	
30	MW306R	13/12/2023	W	X	X	X	X	X	X	X	X	
31	MW302R	13/12/2023	W	X	X	X	X	X	X	X	X	
32	FD01	13/12/2023	W	X	X							
33	FD02	13/12/2023	W								X	
34												
35												
36												
37												

**Sample comments:**

Environmental Division  
 Sydney  
 Work Order Reference  
**ES2343916**



Telephone: +61-2-8794 8555

Send to ALS for Same Analysis as FD01

Temperature on arrival:

20.3

Report number:

1053368

Relinquished By: <b>L. Parkinson</b>	Received By: <b>J. Standen</b>	Turn around time	
Date & Time: <b>13/12/23</b>	Date & Time: <b>13/12 12:10</b>	1 DAY <input type="checkbox"/>	2 DAY <input type="checkbox"/>
Signature: <i>[Signature]</i>	Signature: <i>[Signature]</i>	3 DAY <input type="checkbox"/>	5 DAY <input checked="" type="checkbox"/>
		10 DAY <input type="checkbox"/>	Other: <input type="checkbox"/>

- Courier
- Hand Delive
- Postal
- Courier Consign

Ashid 15112  
 1200

# **Appendix F**

**Field sheets**





# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID... Basin 1

PROJECT NO.	<u>12584780</u>	DATE:	<u>15/1/23</u>
PROJECT NAME:	<u>Aurizon TSF Hexham Monitoring</u>	TIME:	<u>11:00</u>
CLIENT:	<u>Aurizon</u>	SAMPLING OFFICER:	<u>LP</u>

COORDINATES/GPS (if Applicable) \_\_\_\_\_

SAMPLING METHOD (ie grab, bucket) Grab

DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

### ENVIRONMENTAL OBSERVATIONS

WEATHER \_\_\_\_\_

VEGETATION Fine long reeds in pond and along bank

SLOPE -

EROSION -

OTHER Basin 1 = shallow water, pond next to basin almost completely dry

### FIELD MEASUREMENTS

TEMPERATURE (°C):	<u>22.6</u>	CONDUCTIVITY (uS/cm):	<u>1313</u>
pH:	<u>7.04</u>	DO (mg/L):	<u>0.43</u>
REDOX (mV):	<u>-294.6</u>	Turbidity (NTU):	<u>229.34</u>

Sheen, Colour, Odour, Brown, very turbid, lots of vegetation/dead weed

Sediment Description in water, Mild Hydrogen sulfide odour, No sheen

### HYDROLOGICAL DATA

FLOW MEASUREMENT (or stream height if rating table available) cm/min

CROSS SECTION WIDTH (m) cm

DEPTH (m) cm

OTHER \_\_\_\_\_

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
<u>Basin 1</u>	<u>-</u>	<u>No Sample</u>	<u>-</u>	<u>Field parameters ONLY</u>



# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID. Basin...2

PROJECT NO. 12584780 DATE: 16/1/23  
PROJECT NAME: Aurizon TSF Hexham Monitoring TIME: 09:30  
CLIENT: Aurizon SAMPLING OFFICER: \_\_\_\_\_

COORDINATES/GPS (if Applicable) \_\_\_\_\_  
SAMPLING METHOD (ie grab, bucket) Grab  
DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

## ENVIRONMENTAL OBSERVATIONS

WEATHER \_\_\_\_\_  
VEGETATION \_\_\_\_\_  
SLOPE \_\_\_\_\_  
EROSION \_\_\_\_\_  
OTHER \_\_\_\_\_

DRY

## FIELD MEASUREMENTS

TEMPERATURE (°C): \_\_\_\_\_ CONDUCTIVITY (uS/cm): \_\_\_\_\_  
pH: \_\_\_\_\_ DO (mg/L) \_\_\_\_\_  
REDOX (mV): \_\_\_\_\_ Turbidity (NTU) \_\_\_\_\_  
Sheen, Colour, Odour, \_\_\_\_\_  
Sediment Description \_\_\_\_\_

## HYDROLOGICAL DATA

FLOW MEASUREMENT  
(or stream height if rating table available) \_\_\_\_\_  
CROSS SECTION WIDTH (m) \_\_\_\_\_  
DEPTH (m) \_\_\_\_\_  
OTHER \_\_\_\_\_

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
_____	<u>Location</u>	<u>Dry - No</u>	<u>parameters</u>	<u>taken as no water available</u>
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____



# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID Basin 3

PROJECT NO. 12584780 DATE: 16/1/23  
 PROJECT NAME: Aurizon TSF Hexham Monitoring TIME: 10:20  
 CLIENT: Aurizon SAMPLING OFFICER: LP

COORDINATES/GPS (If Applicable) \_\_\_\_\_  
 SAMPLING METHOD (ie grab, bucket) Grab  
 DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

### ENVIRONMENTAL OBSERVATIONS

WEATHER Fine  
 VEGETATION long reeds in pond  
 SLOPE -  
 EROSION -  
 OTHER \_\_\_\_\_

### FIELD MEASUREMENTS

TEMPERATURE (°C): 19.8 CONDUCTIVITY (uS/cm): 2486  
 pH: 7.36 DO (mg/L): 1.12  
 REDOX (mV): -228.7 Turbidity (NTU): 41.47  
 Sheen, Colour, Odour. Duck weed on water surface, Brown, turbid,  
 Sediment Description No odour, slight Bacterial Sheen

### HYDROLOGICAL DATA

FLOW MEASUREMENT (or stream height if rating table available) cm/min  
 CROSS SECTION WIDTH (m) >1m  
 DEPTH (m) cm  
 OTHER -

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
<u>Basin 3</u>	<u>-</u>	<u>No sample</u>	<u>- Field</u>	<u>Parameters ONLY -</u>



# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID: Basin 1

PROJECT NO. 12584780 DATE: 24/02/2023  
 PROJECT NAME: Aurizon TSF Hexham Monitoring TIME: 09:45  
 CLIENT: Aurizon SAMPLING OFFICER: CB

COORDINATES/GPS (if Applicable) \_\_\_\_\_  
 SAMPLING METHOD (ie grab, bucket) Grab  
 DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

### ENVIRONMENTAL OBSERVATIONS

WEATHER Fine  
 VEGETATION -  
 SLOPE -  
 EROSION -  
 OTHER \_\_\_\_\_

### FIELD MEASUREMENTS

TEMPERATURE (°C): 20.3 CONDUCTIVITY (uS/cm): 663  
 pH: 7.00 DO (mg/L): 0.66  
 REDOX (mV): -82.4 Turbidity (NTU): 29.22  
 Sheen, Colour, Odour. No sheen, Brown, very turbid  
 Sediment Description duck weed in water, No sheen, No odour

### HYDROLOGICAL DATA

FLOW MEASUREMENT (or stream height if rating table available) <1m  
 CROSS SECTION WIDTH (m) >1m  
 DEPTH (m) <1m  
 OTHER -

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
<u>Basin 1</u>	<u>8</u>	<u>ICE</u>	<u>-</u>	<u>_____</u>
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____



# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID... Basin 2

PROJECT NO.	<u>12584780</u>	DATE:	<u>24/02/2023</u>
PROJECT NAME:	<u>Aurizon TSF Hexham Monitoring</u>	TIME:	<u>07:10</u>
CLIENT:	<u>Aurizon</u>	SAMPLING OFFICER:	<u>CP</u>

COORDINATES/GPS (if Applicable) \_\_\_\_\_

SAMPLING METHOD (ie grab, bucket) Grab

DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

ENVIRONMENTAL OBSERVATIONS

WEATHER \_\_\_\_\_

VEGETATION \_\_\_\_\_

SLOPE \_\_\_\_\_

EROSION \_\_\_\_\_

OTHER \_\_\_\_\_

DRY

FIELD MEASUREMENTS

TEMPERATURE (°C):	_____	CONDUCTIVITY (uS/cm):	_____
pH:	_____	DO (mg/L)	_____
REDOX (mV):	_____	Turbidity (NTU)	_____

Sheen, Colour, Odour, \_\_\_\_\_

Sediment Description \_\_\_\_\_

HYDROLOGICAL DATA

FLOW MEASUREMENT  
(or stream height if rating table available) \_\_\_\_\_

CROSS SECTION WIDTH (m) \_\_\_\_\_

DEPTH (m) \_\_\_\_\_

OTHER \_\_\_\_\_

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS



# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID Basin 3

PROJECT NO. 12584780 DATE: 24/02/2023  
 PROJECT NAME: Aurizon TSF Hexham Monitoring TIME: 08:10  
 CLIENT: Aurizon SAMPLING OFFICER: LB

COORDINATES/GPS (if Applicable) \_\_\_\_\_  
 SAMPLING METHOD (ie grab, bucket) Grab  
 DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

## ENVIRONMENTAL OBSERVATIONS

WEATHER \_\_\_\_\_  
 VEGETATION Fire reeds  
 SLOPE -  
 EROSION -  
 OTHER -

## FIELD MEASUREMENTS

TEMPERATURE (°C): 19.6 CONDUCTIVITY (uS/cm): 1615  
 pH: 7.16 DO (mg/L): 0.33  
 REDOX (mV): -117.6 Turbidity (NTU): 11.02  
 Sheen, Colour, Odour, Slightly yellow, slightly turbid, vegetation (sticks, duck weed)  
 Sediment Description No odour, slight bacterial sheen

## HYDROLOGICAL DATA

FLOW MEASUREMENT (or stream height if rating table available) 1m  
 CROSS SECTION WIDTH (m) >1m  
 DEPTH (m) <1m  
 OTHER \_\_\_\_\_

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
<u>Basin 3</u>	<u>8</u>	<u>ICE</u>	<u>-</u>	<u>-</u>



# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID: SW1.....

PROJECT NO. 12584780 DATE: 24/02/2023  
 PROJECT NAME: Aurizon TSF Hexham Monitoring TIME: 10:20  
 CLIENT: Aurizon SAMPLING OFFICER: CB

COORDINATES/GPS (if Applicable) \_\_\_\_\_  
 SAMPLING METHOD (ie grab, bucket) Grab  
 DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

### ENVIRONMENTAL OBSERVATIONS

WEATHER Fine  
 VEGETATION -  
 SLOPE -  
 EROSION ✓  
 OTHER \_\_\_\_\_

### FIELD MEASUREMENTS

TEMPERATURE (°C): 23.0 CONDUCTIVITY (uS/cm): 3409  
 pH: 5.99 DO (mg/L): 4.17  
 REDOX (mV): 29.1 Turbidity (NTU): 245.7  
 Sheen, Colour, Odour, No odour, No sheen, duck weed and sticks,  
 Sediment Description dark Brown, very turbid.

### HYDROLOGICAL DATA

FLOW MEASUREMENT (or stream height if rating table available) clm  
 CROSS SECTION WIDTH (m) 7m  
 DEPTH (m) 7m  
 OTHER \_\_\_\_\_

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
<u>SW1</u>	<u>8</u>	<u>ICE</u>	<u>-</u>	<u>-</u>



# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID... SW2

PROJECT NO. 12584780 DATE: 24/02/2023  
 PROJECT NAME: Aurizon TSF Hexham Monitoring TIME: 09:15  
 CLIENT: Aurizon SAMPLING OFFICER: [Signature]

COORDINATES/GPS (if Applicable) \_\_\_\_\_  
 SAMPLING METHOD (ie grab, bucket) Grab  
 DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

### ENVIRONMENTAL OBSERVATIONS

WEATHER Fine, HOT  
 VEGETATION -  
 SLOPE -  
 EROSION -  
 OTHER \_\_\_\_\_

### FIELD MEASUREMENTS

TEMPERATURE (°C): 21.9 CONDUCTIVITY (uS/cm): 3027  
 pH: 6.38 DO (mg/L): 235  
 REDOX (mV): 44.1 Turbidity (NTU): 92.75  
 Sheen, Colour, Odour, Slightly yellow, slightly Turbid, Backrinl sheen,  
 Sediment Description No odour, algae in sample.

### HYDROLOGICAL DATA

FLOW MEASUREMENT (or stream height if rating table available) dn  
 CROSS SECTION WIDTH (m) 7m  
 DEPTH (m) 7m  
 OTHER \_\_\_\_\_

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
<u>SW2</u>	<u>8</u>	<u>ICE</u>	<u>-</u>	<u>-</u>





# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID SW3

PROJECT NO. 12584780 DATE: 24/02/2023  
 PROJECT NAME: Aurizon TSF Hexham Monitoring TIME: 09:00  
 CLIENT: Aurizon SAMPLING OFFICER: CP

COORDINATES/GPS (if Applicable) \_\_\_\_\_  
 SAMPLING METHOD (ie grab, bucket) Grab  
 DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

## ENVIRONMENTAL OBSERVATIONS

WEATHER Fine  
 VEGETATION duck weed on water surface  
 SLOPE \_\_\_\_\_  
 EROSION \_\_\_\_\_  
 OTHER Horses near SW point

## FIELD MEASUREMENTS

TEMPERATURE (°C): 21.5 CONDUCTIVITY (uS/cm): 1394  
 pH: 6.64 DO (mg/L): 3.27  
 REDOX (mV): 45.2 Turbidity (NTU): 31.55  
 Sheen, Colour, Odour, Slightly yellow, slightly turbid, no odour,  
 Sediment Description No sheen, no sediment

## HYDROLOGICAL DATA

FLOW MEASUREMENT (or stream height if rating table available) cm  
 CROSS SECTION WIDTH (m) 7m  
 DEPTH (m) cm  
 OTHER \_\_\_\_\_

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
<u>SW3</u>	<u>8</u>	<u>ICE</u>	<u>-</u>	<u>-</u>



# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID... SW4 .....

PROJECT NO. 12584780 DATE: 24/02/2023  
PROJECT NAME: Aurizon TSF Hexham Monitoring TIME: 08:25  
CLIENT: Aurizon SAMPLING OFFICER: [Signature]

COORDINATES/GPS (if Applicable) \_\_\_\_\_  
SAMPLING METHOD (ie grab, bucket) Grab  
DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

## ENVIRONMENTAL OBSERVATIONS

WEATHER Fine  
VEGETATION grass  
SLOPE -  
EROSION -  
OTHER -

## FIELD MEASUREMENTS

TEMPERATURE (°C): 19.8 CONDUCTIVITY (uS/cm): 3252  
pH: 5.99 DO (mg/L): 1.70  
REDOX (mV): 53.9 Turbidity (NTU): 29.95  
Sheen, Colour, Odour, Brown, turbid, No sheen, No odour, No sediment  
Sediment Description \_\_\_\_\_

## HYDROLOGICAL DATA

FLOW MEASUREMENT (or stream height if rating table available) clm  
CROSS SECTION WIDTH (m) 7m  
DEPTH (m) clm  
OTHER -

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
<u>SW4</u>	<u>8</u>	<u>ICE</u>	<u>-</u>	



# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID: SW4A

PROJECT NO. 12584780 DATE: 24/02/2023  
 PROJECT NAME: Aurizon TSF Hexham Monitoring TIME: 08:20  
 CLIENT: Aurizon SAMPLING OFFICER: [Signature]

COORDINATES/GPS (if Applicable) \_\_\_\_\_  
 SAMPLING METHOD (ie grab, bucket) Grab  
 DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

### ENVIRONMENTAL OBSERVATIONS

WEATHER Fine  
 VEGETATION reeds  
 SLOPE -  
 EROSION -  
 OTHER -

### FIELD MEASUREMENTS

TEMPERATURE (°C): 20.0 CONDUCTIVITY (uS/cm): 4085  
 pH: 5.97 DO (mg/L): 1.45  
 REDOX (mV): 28.4 Turbidity (NTU): 6.68  
 Sheen, Colour, Odour. same as SW4  
 Sediment Description \_\_\_\_\_

### HYDROLOGICAL DATA

FLOW MEASUREMENT (or stream height if rating table available) 1m  
 CROSS SECTION WIDTH (m) 7m  
 DEPTH (m) 1m  
 OTHER \_\_\_\_\_

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
<u>SW4A</u>	<u>8</u>	<u>SCE</u>	<u>-</u>	<u>-</u>



# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID SWS

PROJECT NO. 12584780 DATE: 24/02/2023  
 PROJECT NAME: Aurizon TSF Hexham Monitoring TIME: 07:55  
 CLIENT: Aurizon SAMPLING OFFICER: LB

COORDINATES/GPS (If Applicable) \_\_\_\_\_  
 SAMPLING METHOD (ie grab, bucket) Grab  
 DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

### ENVIRONMENTAL OBSERVATIONS

WEATHER Fine  
 VEGETATION reeds  
 SLOPE -  
 EROSION -  
 OTHER \_\_\_\_\_

### FIELD MEASUREMENTS

TEMPERATURE (°C): 20.4 CONDUCTIVITY (uS/cm): 1373  
 pH: 5.93 DO (mg/L): 2.10  
 REDOX (mV): 19.5 Turbidity (NTU): 2633  
 Sheen, Colour, Odour, Orange, Moderately turbid, lots of orange algae  
 Sediment Description Slight Bacterial Sheen, No odour

### HYDROLOGICAL DATA

FLOW MEASUREMENT (or stream height if rating table available) 1m  
 CROSS SECTION WIDTH (m) 1m  
 DEPTH (m) 1m  
 OTHER \_\_\_\_\_

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
<u>SWS</u>	<u>8</u>	<u>ICE</u>	<u>-</u>	<u>-</u>



# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID... SW6

PROJECT NO. 12584780 DATE: 24/02/2023  
PROJECT NAME: Aurizon TSF Hexham Monitoring TIME: 08:30  
CLIENT: Aurizon SAMPLING OFFICER: CP

COORDINATES/GPS (if Applicable) \_\_\_\_\_  
SAMPLING METHOD (ie grab, bucket) Grab  
DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

## ENVIRONMENTAL OBSERVATIONS

WEATHER Fine  
VEGETATION -  
SLOPE -  
EROSION -  
OTHER \_\_\_\_\_

## FIELD MEASUREMENTS

TEMPERATURE (°C): 20.2 CONDUCTIVITY (uS/cm): 1420  
pH: 6.07 DO (mg/L): 1.82  
REDOX (mV): 43.9 Turbidity (NTU): 12.76  
Sheen, Colour, Odour: slight Bacterial Sheen, No odour, dark brown  
Sediment Description: Moderately turbid. Small sediments

## HYDROLOGICAL DATA

FLOW MEASUREMENT (or stream height if rating table available) cm  
CROSS SECTION WIDTH (m) cm  
DEPTH (m) cm  
OTHER \_\_\_\_\_

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
<u>SW6</u>	<u>8</u>	<u>ILG</u>	<u>-</u>	<u>-</u>



# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID SW7

PROJECT NO. 12584780 DATE: 24/02/2023  
 PROJECT NAME: Aurizon TSF Hexham Monitoring TIME: 07:35  
 CLIENT: Aurizon SAMPLING OFFICER: LP

COORDINATES/GPS (if Applicable) \_\_\_\_\_  
 SAMPLING METHOD (ie grab, bucket) Grab  
 DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

### ENVIRONMENTAL OBSERVATIONS

WEATHER Fine  
 VEGETATION -  
 SLOPE -  
 EROSION -  
 OTHER -

### FIELD MEASUREMENTS

TEMPERATURE (°C): 20.5 CONDUCTIVITY (uS/cm): 1878  
 pH: 5.85 DO (mg/L): 0.20  
 REDOX (mV): -59.6 Turbidity (NTU): 89.63  
 Sheen, Colour, Odour, High Bacterial Sheen, no odor, Very turbid, dark brown,  
 Sediment Description trace algae, lots of black sediment

### HYDROLOGICAL DATA

FLOW MEASUREMENT (or stream height if rating table available) <1m  
 CROSS SECTION WIDTH (m) 1m  
 DEPTH (m) 1m  
 OTHER -

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
<u>SW7</u>	<u>8</u>	<u>ICE</u>	<u>-</u>	<u>-</u>



# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID... SW8...

PROJECT NO. 12584780 DATE: 24/02/2023  
 PROJECT NAME: Aurizon TSF Hexham Monitoring TIME: 11:10  
 CLIENT: Aurizon SAMPLING OFFICER: CB

COORDINATES/GPS (if Applicable) \_\_\_\_\_  
 SAMPLING METHOD (ie grab, bucket) Grab  
 DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

### ENVIRONMENTAL OBSERVATIONS

WEATHER \_\_\_\_\_  
 VEGETATION \_\_\_\_\_  
 SLOPE \_\_\_\_\_  
 EROSION \_\_\_\_\_  
 OTHER \_\_\_\_\_

**FLOODED  
BY  
HUNTER RIVER**

### FIELD MEASUREMENTS

TEMPERATURE (°C): \_\_\_\_\_ CONDUCTIVITY (uS/cm): \_\_\_\_\_  
 pH: \_\_\_\_\_ DO (mg/L) \_\_\_\_\_  
 REDOX (mV): \_\_\_\_\_ Turbidity (NTU) \_\_\_\_\_  
 Sheen, Colour, Odour, \_\_\_\_\_  
 Sediment Description \_\_\_\_\_

### HYDROLOGICAL DATA

FLOW MEASUREMENT  
(or stream height if rating table available) \_\_\_\_\_  
 CROSS SECTION WIDTH (m) \_\_\_\_\_  
 DEPTH (m) \_\_\_\_\_  
 OTHER \_\_\_\_\_

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS



# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID SW9

PROJECT NO. 12584780 DATE: 24/02/2023  
 PROJECT NAME: Aurizon TSF Hexham Monitoring TIME: 11:15  
 CLIENT: Aurizon SAMPLING OFFICER: CP

COORDINATES/GPS (if Applicable)

SAMPLING METHOD (ie grab, bucket)

Grab

DETAILED SAMPLE LOCATION DESCRIPTION

asbestos Pipe outlet @ Humber River

## ENVIRONMENTAL OBSERVATIONS

WEATHER

Fine

VEGETATION

-

SLOPE

-

EROSION

-

OTHER

-

## FIELD MEASUREMENTS

TEMPERATURE (°C):

23.7

CONDUCTIVITY (uS/cm):

28200

pH:

6.90

DO (mg/L):

4.30

REDOX (mV):

-30

Turbidity (NTU):

13.5

Sheen, Colour, Odour,

clear, colourless, No odour, No sheen

Sediment Description

## HYDROLOGICAL DATA

FLOW MEASUREMENT

(or stream height if rating table available)

1m

CROSS SECTION WIDTH (m)

1m

DEPTH (m)

1m

OTHER

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
<u>SW9</u>	<u>8</u>	<u>ICE</u>	<u>-</u>	<u>-</u>





# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID... Sw10

PROJECT NO. 12584780 DATE: 24/02/2023  
PROJECT NAME: Aurizon TSF Hexham Monitoring TIME: 10:50  
CLIENT: Aurizon SAMPLING OFFICER: \_\_\_\_\_

COORDINATES/GPS (If Applicable) \_\_\_\_\_

SAMPLING METHOD (ie grab, bucket) Grab

DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

## ENVIRONMENTAL OBSERVATIONS

WEATHER \_\_\_\_\_

VEGETATION \_\_\_\_\_

SLOPE \_\_\_\_\_

EROSION \_\_\_\_\_

OTHER \_\_\_\_\_

DRY

## FIELD MEASUREMENTS

TEMPERATURE (°C): \_\_\_\_\_

CONDUCTIVITY (uS/cm): \_\_\_\_\_

pH: \_\_\_\_\_

DO (mg/L) \_\_\_\_\_

REDOX (mV): \_\_\_\_\_

Turbidity (NTU) \_\_\_\_\_

Sheen, Colour, Odour, \_\_\_\_\_

Sediment Description \_\_\_\_\_

## HYDROLOGICAL DATA

FLOW MEASUREMENT  
(or stream height if rating table available) \_\_\_\_\_

CROSS SECTION WIDTH (m) \_\_\_\_\_

DEPTH (m) \_\_\_\_\_

OTHER \_\_\_\_\_

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____



# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID. SW11

PROJECT NO. 12584780 DATE: 24/02/2023  
PROJECT NAME: Aurizon TSF Hexham Monitoring TIME: 09:30  
CLIENT: Aurizon SAMPLING OFFICER: CB

COORDINATES/GPS (if Applicable) \_\_\_\_\_  
SAMPLING METHOD (ie grab, bucket) Grab  
DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

ENVIRONMENTAL OBSERVATIONS  
WEATHER Hot  
VEGETATION -  
SLOPE -  
EROSION -  
OTHER \_\_\_\_\_

FIELD MEASUREMENTS  
TEMPERATURE (°C): 22.0 CONDUCTIVITY (uS/cm): 3470  
pH: 6.56 DO (mg/L): 2.23  
REDOX (mV): 27.1 Turbidity (NTU): 27.9  
Sheen, Colour, Odour, pale yellow slightly turbid, No sediment  
Sediment Description No sheen, No odour.

HYDROLOGICAL DATA  
FLOW MEASUREMENT (or stream height if rating table available) <1m  
CROSS SECTION WIDTH (m) 7m  
DEPTH (m) >1m  
OTHER \_\_\_\_\_

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
<u>SW11</u>	<u>8</u>	<u>ICE</u>	<u>-</u>	<u>✓</u>



# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID Basin 1

PROJECT NO. 12584780 DATE: 28/2/2023  
 PROJECT NAME: Aurizon TSF Hexham Monitoring TIME: 12:30  
 CLIENT: Aurizon SAMPLING OFFICER: [Signature]

COORDINATES/GPS (if Applicable) \_\_\_\_\_  
 SAMPLING METHOD (ie grab, bucket) \_\_\_\_\_  
 DETAILED SAMPLE LOCATION DESCRIPTION -

### ENVIRONMENTAL OBSERVATIONS

WEATHER Fine  
 VEGETATION Reeds, Duck weed  
 SLOPE -  
 EROSION -  
 OTHER \_\_\_\_\_

### FIELD MEASUREMENTS

TEMPERATURE (°C): 22.4 CONDUCTIVITY (uS/cm): 850  
 pH: 7.30 DO (mg/L): 0.70  
 REDOX (mV): -168.1 Turbidity (NTU): 22.6  
 Sheen, Colour, Odour, Duck Weed, Brown, turbid, no colour, no  
 Sediment Description sheen. vegetation in water

### HYDROLOGICAL DATA

FLOW MEASUREMENT (or stream height if rating table available) < 1m  
 CROSS SECTION WIDTH (m) 7m  
 DEPTH (m) 7m  
 OTHER \_\_\_\_\_

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
<u>- monthly</u>	<u>- Field</u>	<u>Parameter</u>	<u>only</u>	<u>-</u>



# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID Boon 2

PROJECT NO. 12584780 DATE: 28/2/2023  
 PROJECT NAME: Aurizon TSF Hexham Monitoring TIME: 11:00  
 CLIENT: Aurizon SAMPLING OFFICER: \_\_\_\_\_

COORDINATES/GPS (if Applicable) \_\_\_\_\_  
 SAMPLING METHOD (ie grab, bucket) \_\_\_\_\_  
 DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

ENVIRONMENTAL OBSERVATIONS  
 WEATHER \_\_\_\_\_  
 VEGETATION \_\_\_\_\_  
 SLOPE \_\_\_\_\_  
 EROSION \_\_\_\_\_  
 OTHER \_\_\_\_\_

**DRY**

FIELD MEASUREMENTS  
 TEMPERATURE (°C): \_\_\_\_\_ CONDUCTIVITY (uS/cm): \_\_\_\_\_  
 pH: \_\_\_\_\_ DO (mg/L): \_\_\_\_\_  
 REDOX (mV): \_\_\_\_\_ Turbidity (NTU): \_\_\_\_\_  
 Sheen, Colour, Odour, \_\_\_\_\_  
 Sediment Description \_\_\_\_\_

HYDROLOGICAL DATA  
 FLOW MEASUREMENT  
 (or stream height if rating table available) \_\_\_\_\_  
 CROSS SECTION WIDTH (m) \_\_\_\_\_  
 DEPTH (m) \_\_\_\_\_  
 OTHER \_\_\_\_\_

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS



# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID... Basin 3

PROJECT NO. 12584780 DATE: 28/2/2023  
 PROJECT NAME: Aurizon TSF Hexham Monitoring TIME: 11:40  
 CLIENT: Aurizon SAMPLING OFFICER: [Signature]

COORDINATES/GPS (if Applicable) \_\_\_\_\_  
 SAMPLING METHOD (ie grab, bucket) \_\_\_\_\_  
 DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

### ENVIRONMENTAL OBSERVATIONS

WEATHER Fire, feeds  
 VEGETATION ↓  
 SLOPE -  
 EROSION -  
 OTHER \_\_\_\_\_

### FIELD MEASUREMENTS

TEMPERATURE (°C): 22.2 CONDUCTIVITY (uS/cm): 1663  
 pH: 7.50 DO (mg/L): 0.30  
 REDOX (mV): -173.1 Turbidity (NTU): 37.50  
 Sheen, Colour, Odour, Bacterial sheen, Brown, turbid, dark weed on  
 Sediment Description Surface. No silt.

### HYDROLOGICAL DATA

FLOW MEASUREMENT (or stream height if rating table available) < 1m  
 CROSS SECTION WIDTH (m) 7m  
 DEPTH (m) 7m  
 OTHER \_\_\_\_\_

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
<u>- Monthly</u>	<u>-</u>	<u>Parameters</u>	<u>ONLY</u>	<u>-</u>



# Purging and Sampling Record

Bore ID: 101R

Job Information	Sampling Information	Bore Information
Client: Aurizon	Purge Method: MP <u>Peri</u>	SWL(mbTOC): <u>1.99</u> m Logic Check: N/A
Project: TSF Hexham Compliance Monitoring	Sample Method: MP <u>Peri</u>	Screen: From: N/A m Stick Up: as prev. round
Proj. No.: 12584780	WQ Meter Type: ProDSS	NAPL Check: <u>No</u> Bore Diam.: 50 mm
Sampler: <u>LP</u> NF	Flow Cell: Y Pump Depth: -----	Ref.datum: TOC Well Cap Secure? <u>yes</u>
Date: 22/03/2023	WLevel Meter Type: Dip / Fox <u>Int.Fce</u> / Gge	Bore Depth: <u>91 per round.</u> m PID...N/A
Round: Q1	Field Filtered? <u>Y</u> / N (filter vessel, <u>disposable filter</u> / syringe)	

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec. Cond (µS/cm)	Dis. Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m TOC)	<u>N/A</u>	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
07:40	0.5	21.5	6.43	7900	0.73	-89.8	2.30	53.87	Clean colourless, non-turbid,
07:43	1.0	21.5	6.43	7864	0.40	-97.3	2.38	32.75	trace orange algae, No sheen,
07:46	1.5	21.5	6.43	7715	0.18	-98.7	2.47	19.75	No odour
07:49	2.0	21.6	6.41	7565	0.21	-92.9	2.52	20.70	
07:52	2.5	21.5	6.39	7345	0.18	-96.2	2.57	21.82	
07:55	3.0	21.5	6.39	7325	0.20	-93.9	2.62	21.04	

<b>Field QA Checks:</b> Air bubbles in vials? Y <u>N</u> Any violent reactions? Y / N <u>N</u> Decontamination as per GHD procedure? Y / N <u>N</u> Was sampling equipment pre-cleaned? Y / N <u>N</u> COC updated? Y / N <u>N</u>		<table border="1"> <thead> <tr> <th>Parameters</th> <th>BPFX</th> <th>TPH</th> <th>PAH</th> <th>CHC</th> <th>PCB</th> <th>OCP</th> <th>OPP</th> <th>Tot. Metal</th> <th>Biol.</th> <th>Total Purities</th> </tr> </thead> <tbody> <tr> <td>Preservatives</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>8</td> </tr> </tbody> </table>	Parameters	BPFX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.	Total Purities	Preservatives										8
Parameters	BPFX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.	Total Purities														
Preservatives										8														

**Comment:** Duplicate samples collected, bottles used, access, condition of headworks etc.

**Purge Volumes**  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack



# Purging and Sampling Record

Bore ID: MW01R

Job Information	Sampling Information	Bore Information
Client: Aurizon	Purge Method: MP <u>Peri</u>	SWL(mbTOC): <u>1.53</u> m Logic Check: N/A
Project: TSF Hexham Compliance Monitoring	Sample Method: MP <u>Peri</u>	Screen: From: N/A m Stick Up: as prev. round
Proj. No.: 12584780	WQ Meter Type: ProDSS	NAPL Check: <u>NO</u> Bore Diam.: 50 mm
Sampler: <u>LP</u> / NF	Flow Cell: Y Pump Depth: ----	Ref.datum: TOC Well Cap Secure? <u>NO</u>
Date: 22/03/2023	WLevel Meter Type: Dip / Fox <u>(Int.Fce)</u> / Gge	Bore Depth: <u>31.85m</u> m PID...N/A
Round: Q1	Field Filtered? <u>Y</u> / N (filter vessel, <u>disposable filter</u> / syringe)	

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µS/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m TOC)	Turbidity (NTU)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
13:00	0.5	22.1	6.58	6340	3.12	-77.2	1.74	628.00	Clear, colourless, Min-turbid, No odour, No sheen, trace algae (orange)
13:03	1.0	22.0	6.40	8277	3.34	-66.5	1.80	1000	
13:06	1.5	21.7	6.41	8595	3.52	-68.2	1.87	999.82	
13:09	2.0	21.6	6.34	8497	3.60	-61.7	2.04	1235.5	
13:12	2.5	21.7	6.32	8568	4.00	-58.7	2.21	1265.70	
13:15	3.0	21.7	6.32	8646	4.04	-56.7	2.29	1325.10	

<p><b>Field QA Checks:</b></p> <p>Air bubbles in vials? <u>Y</u> / N Any violent reactions? <u>Y</u> / N</p> <p>Decontamination as per GHD procedure? <u>Y</u> / N</p> <p>Was sampling equipment pre-cleaned? <u>Y</u> / N</p> <p>COC updated? <u>Y</u> / N</p>	<table border="1"> <thead> <tr> <th>Parameters</th> <th>BTEX</th> <th>TPH</th> <th>PAH</th> <th>CHC</th> <th>PCB</th> <th>OCP</th> <th>OPP</th> <th>Tot. Metal</th> <th>Biol.</th> <th></th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>Preservatives</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.					Preservatives													
Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.																				
Preservatives																													

**Comment:** Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack



# Purging and Sampling Record

Bore ID: MWOZ

Job Information	Sampling Information	Bore Information
Client: Aurizon	Purge Method: MP <u>Peri</u>	SWL(mbTOC): <u>1.78</u> m Logic Check: N/A
Project: TSF Hexham Compliance Monitoring	Sample Method: MP <u>Peri</u>	Screen: From: N/A m Stick Up: as prev. round
Proj. No.: 12584780	WQ Meter Type: ProDSS	NAPL Check:..... Bore Diam.: 50 mm
Sampler: LP / NF	Flow Cell: Y Pump Depth: ----	Ref.datum: TOC Well Cap Secure?.....
Date: 22/03/2023	WLevel Meter Type: Dip / Fox / <u>Int.Fce</u> / Gge	Bore Depth: <u>2.68</u> m PID...N/A
Round: Q1	Field Filtered? <u>Y</u> / N (filter vessel, <u>disposable filter</u> / syringe)	

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (.....)	Dis.Oxygen (.....)	Ox-Red Pt. (± mV)	SWL (m TOC) (.....)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings)		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable	
	0.5	22.1	5.34	1583	0.48	44.3	1.81	<del>1.81</del>
	1.0	22	5.31	1602	0.86	50.6	1.81	
	1.5	21.9	5.28	1608	0.67	55.3	1.81	
	2.0	22.0	5.27	1608	0.75	56.9	1.81	
	2.5	22.0	5.27	1609	0.81	58.5	1.81	
	3.0	22.0	5.27	1609	0.91	59.6	1.81	Turbid, orange/brown, no s/o

<b>Field QA Checks:</b> Air bubbles in vials? Y / <u>N</u> Any violent reactions? Y / <u>N</u> Decontamination as per GHD procedure? Y / <u>N</u> Was sampling equipment pre-cleaned? Y / <u>N</u> COC updated? Y / <u>N</u>		<table border="1"> <tr> <td>Parameters</td> <td>BTEX</td> <td>TPH</td> <td>PAH</td> <td>CHC</td> <td>PCB</td> <td>OCP</td> <td>OPP</td> <td>Tot. Metal</td> <td>Biol.</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Preservatives</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.					Preservatives													
Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.																					
Preservatives																														

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack





# Purging and Sampling Record

Bore ID: MW101 R

Job information	Sampling information	Bore information
Client: Aurizon Project: TSF Hexham Compliance Monitoring Proj. No.: 12584780 Sampler: LP / NF Date: 22/03/2023 Round: Q1	Purge Method: MP <u>Peri</u> Sample Method: MP <u>Peri</u> WQ Meter Type: ProDSS Flow Cell: Y Pump Depth: --- WLevel Meter Type: Dip / Fox <u>(Int.Fce)</u> / Gge Field Filtered? <u>Y</u> / N (filter vessel, <u>disposable filter</u> / syringe)	SWL(mbTOC): <u>1.31</u> m Screen: From: N/A m NAPL Check: ..... Ref.datum: TOC Bore Depth: <u>3.19</u> m Logic Check: N/A Stick Up: as prev. round Bore Diam.: 50 mm Well Cap Secure? ..... PID...N/A

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (.....)	Dis.Oxygen (.....)	Ox-Red Pt. (± mV)	SWL (m TOC) (.....)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):								
		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable	
12:00	0.5	20	6.52	22405	0.26	-19.8	1.47	
	1.0	20.1	6.51	22283	0.23	-22.5	1.47	
	1.5	20.3	6.50	22129	0.20	-25.8	1.52	
	2.0	20.5	6.46	21782	0.45	-29.3	1.59	
	2.5	20.6	6.43	21606	0.53	-28.1	1.62	
	3.0	20.8	6.42	21473	0.57	-25.6	1.66	Dark grey/black, turbid, no sheen, hydrogen sulfide odour

<p><b>Field QA Checks:</b>          Air bubbles in vials? Y / <u>N</u> Any violent reactions? Y / <u>N</u>          Decontamination as per GHD procedure? <u>Y</u> / N          Was sampling equipment pre-cleaned? <u>Y</u> / N          COC updated? <u>Y</u> / N</p>	<table border="1"> <thead> <tr> <th>Parameters</th> <th>BTEX</th> <th>TPH</th> <th>PAH</th> <th>CHC</th> <th>PCB</th> <th>OCP</th> <th>OPP</th> <th>Tot. Metal</th> <th>Biol.</th> </tr> </thead> <tbody> <tr> <td>Preservatives</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.	Preservatives									
Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.												
Preservatives																					

**Comment:** Duplicate samples collected, bottles used, access, condition of headworks etc

**Purge Volumes**  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack



# Purging and Sampling Record

Bore ID: MW106R

Job Information	Sampling Information	Bore Information
Client: Aurizon	Purge Method: MP <u>Peri</u>	SWL(mbTOC): <u>1.59</u> m
Project: TSF Hexham Compliance Monitoring	Sample Method: MP <u>Peri</u>	Screen: From: N/A m
Proj. No.: <u>12584780</u>	WQ Meter Type: ProDSS	NAPL Check: <u>No</u>
Sampler: <u>LP/NF</u>	Flow Cell: Y Pump Depth: ----	Ref.datum: TOC
Date: <u>22/03/2023</u>	WLevel Meter Type: Dip / Fox <u>Int.Fce</u> / Gge	Bore Depth: <u>as prev. record</u> m
Round: Q1	Field Filtered? <u>Y/N</u> (filter vessel, <u>disposable filter/syringe</u> )	Logic Check: N/A
		Stick Up: as prev. round
		Bore Diam.: 50 mm
		Well Cap Secure? <u>yes</u>
		PID...N/A

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec. Cond (µS/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m TOC)	Turbidity (NTU)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings)		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
<u>09:55</u>	<u>0.5</u>	<u>22.7</u>	<u>6.73</u>	<u>731</u>	<u>1.19</u>	<u>-12.2</u>	<u>1.79</u>	<u>84.44</u>	<u>Clear, colourless, No turbid, No odour, No sheen, No sediment</u>
<u>09:58</u>	<u>1.0</u>	<u>22.6</u>	<u>6.70</u>	<u>721</u>	<u>0.57</u>	<u>-15.9</u>	<u>1.82</u>	<u>209.8</u>	
<u>10:01</u>	<u>1.5</u>	<u>22.6</u>	<u>6.68</u>	<u>726</u>	<u>0.58</u>	<u>-19.0</u>	<u>1.86</u>	<u>313.0</u>	
<u>10:04</u>	<u>2.0</u>	<u>22.5</u>	<u>6.67</u>	<u>726</u>	<u>0.47</u>	<u>-19.8</u>	<u>1.88</u>	<u>206.23</u>	
<u>10:07</u>	<u>2.5</u>	<u>22.4</u>	<u>6.67</u>	<u>725</u>	<u>0.47</u>	<u>-20.4</u>	<u>1.89</u>	<u>477.7</u>	
<u>10:10</u>	<u>3.0</u>	<u>22.3</u>	<u>6.67</u>	<u>723</u>	<u>0.45</u>	<u>-20.1</u>	<u>1.89</u>	<u>12.90</u>	

<p><b>Field QA Checks:</b></p> <p>Air bubbles in vials? <u>Y/N</u> Any violent reactions? <u>Y/N</u></p> <p>Decontamination as per GHD procedure? <u>Y/N</u></p> <p>Was sampling equipment pre-cleaned? <u>Y/N</u></p> <p>COC updated? <u>Y/N</u></p>	<table border="1"> <thead> <tr> <th>Parameters</th> <th>BTEX</th> <th>TPH</th> <th>PAH</th> <th>CHC</th> <th>PCB</th> <th>OCF</th> <th>OPP</th> <th>Tot. Metal</th> <th>Biol.</th> <th>High Turbidity</th> </tr> </thead> <tbody> <tr> <td>Preservatives</td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </tbody> </table>	Parameters	BTEX	TPH	PAH	CHC	PCB	OCF	OPP	Tot. Metal	Biol.	High Turbidity	Preservatives	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Parameters	BTEX	TPH	PAH	CHC	PCB	OCF	OPP	Tot. Metal	Biol.	High Turbidity													
Preservatives	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>													

**Comment:** Duplicate samples collected, bottles used, access, condition of headworks etc

**Purge Volumes**  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack



# Purging and Sampling Record

Bore ID: MW108R

Job Information	Sampling Information	Bore Information
Client: Aurizon	Purge Method: MP <u>Peri</u>	SWL(mbTOC): 2.33 m Logic Check: N/A
Project: TSF Hexham Compliance Monitoring	Sample Method: MP <u>Peri</u>	Screen: From: N/A m Stick Up: as prev. round
Proj. No.: 12584780	WQ Meter Type: ProDSS	NAPL Check:..... Bore Diam.: 50 mm
Sampler: LP / NF	Flow Cell: Y Pump Depth: ----	Ref.datum: TOC Well Cap Secure?.....
Date: 22/03/2023	WLevel Meter Type: Dip / Fox / Int.Fce / Gge	Bore Depth: 4.02 m PID...N/A
Round: Q1	Field Filtered? <u>Y</u> / <u>N</u> (filter vessel, <u>disposable filter</u> / syringe)	

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec. Cond (.....)	Dis. Oxygen (.....)	Ox-Red Pt. (± mV)	SWL (m TOC)	(.....)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
	0.5	22.2	6.51	3907	0.22	-11.1	2.38		Turbid, light brown, no sheen, slight <del>blue</del> Hydrogen sulfide odour
	1.0	22.2	6.36	3788	0.56	5.9	2.38		
	1.5	22.2	6.36	5753	0.64	9.0	2.38		
	2.0	22.2	6.33	3705	0.76	12.1	2.38		
	2.5	22.2	6.31	3652	0.87	13.5	2.38		
	3.0	22.2	6.31	3618	0.94	13.9	2.38		

<b>Field QA Checks:</b> Air bubbles in vials? <u>Y</u> / <u>N</u> Any violent reactions? <u>Y</u> / <u>N</u> Decontamination as per GHD procedure? <u>Y</u> / <u>N</u> Was sampling equipment pre-cleaned? <u>Y</u> / <u>N</u> COC updated? <u>Y</u> / <u>N</u>	<table border="1"> <tr> <th>Parameters</th> <th>BTEX</th> <th>TPH</th> <th>PAH</th> <th>CHC</th> <th>PCB</th> <th>OCP</th> <th>OPP</th> <th>Tot. Metal</th> <th>Biol.</th> </tr> <tr> <td>Preservatives</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.	Preservatives									
Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.												
Preservatives																					

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack



# Purging and Sampling Record

Bore ID: 11W109

Job Information	Sampling Information	Bore Information
Client: Aurizon	Purge Method: MP <u>Peri</u>	SWL(mbTOC): <u>2.30</u> m
Project: TSF Hexham Compliance Monitoring	Sample Method: MP <u>Peri</u>	Screen: From: N/A m
Proj. No.: 12584780	WQ Meter Type: ProDSS	NAPL Check: <u>NO</u>
Sampler: <u>LP/NF</u>	Flow Cell: Y Pump Depth: -----	Ref.datum: TOC
Date: 22/03/2023	WLevel Meter Type: Dip / Fox <u>Int.Fce</u> / Gge	Bore Depth: <u>91 per round</u> m
Round: Q1	Field Filtered? <u>Y/N</u> (filter vessel, <u>disposable filter/syringe</u> )	Logic Check: N/A
		Stick Up: as prev. round
		Bore Diam.: 50 mm
		Well Cap Secure? <u>NO</u>
		PID...N/A

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (uS/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m TOC)	<i>total solids</i> (mg/L)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):									
		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
12:00	0.5	23.7	7.10	2263	3.64	-82.8	2.54	174.44	No odor, No sheen, Slightly yellow-Brown
12:03	1.0	22.8	6.98	4361	3.05	-94.6	2.62	2055.5	Slightly turbid, trace black sediment
12:06	1.5	23.0	6.94	4369	2.83	-95.0	2.71	2195.4	
12:09	2.0	22.9	6.95	4415	3.12	-94.3	2.83	281.69	
12:12	2.5	22.8	6.95	4408	3.04	-93.6	2.95	279.61	
12:15	3.0	22.8	6.95	4412	2.97	-91.8	3.04	268.28	

**Field QA Checks:**

Air bubbles in vials? Y/N Any violent reactions? Y/N

Decontamination as per GHD procedure? Y/N

Was sampling equipment pre-cleaned? Y/N

COC updated? Y/N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.	<i>total solids</i>			
Preservatives	/	/	/	/	/	/	/	/	/	8			

**Comment:** Duplicate samples collected, bottles used, access, condition of headworks etc

*RBO1 taken after this sample of IP*

**Purge Volumes**  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack



# Purging and Sampling Record

Bore ID: MW/301R

Job Information	Sampling Information	Bore Information
Client: Aurizon	Purge Method: MP <u>Peri</u>	SWL(mbTOC): <u>0.71</u> m
Project: TSF Hexham Compliance Monitoring	Sample Method: MP <u>Peri</u>	Screen: From: N/A m
Proj. No.: <u>12584780</u>	WQ Meter Type: ProDSS	NAPL Check: <u>NO</u>
Sampler: <u>LP/NF</u>	Flow Cell: Y Pump Depth: -----	Ref.datum: TOC
Date: 22/03/2023	WLevel Meter Type: Dip / Fox <u>(Int.Fce)</u> Gge	Bore Depth: <u>as prev. round.</u> m
Round: Q1	Field Filtered? <u>Y/N</u> (filter vessel, <u>disposable filter/syringe</u> )	Logic Check: N/A
		Stick Up: as prev. round
		Bore Diam.: <u>50 mm</u>
		Well Cap Secure? <u>Yes</u>
		PID...N/A

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec. Cond (µS/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m TOC)	Turbidity (NTU)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings)		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
10:40	0.5	19.5	6.70	17426	0.26	-49.1	1.18	28.52	moderate sulfur odour, No sheen
10:43	1.0	19.6	6.69	17857	0.17	-48.3	1.29	29.10	
10:46	1.5	19.6	6.66	16553	0.18	-56.3	1.31	30.27	
10:49	2.0	19.6	6.62	15417	0.15	-60.3	1.33	31.80	
10:52	2.5	19.6	6.60	14490	0.02	-62.7	1.38	33.17	
10:55	3.0	19.6	6.59	13370	*0.00	-67.4	1.43	34.94	*D.O dropped below negative
10:58	3.5	19.7	6.58	13001	*0.00	-76.9	1.47	39.22	
11:01	4.0	19.8	6.57	12552	*0.00	-77.9	1.53	40.17	
11:04	4.5	19.8	6.56	13280	*0.00	-78.6	1.56	40.47	

<b>Field QA Checks:</b> Air bubbles in vials? Y <u>N</u> Any violent reactions? Y <u>N</u> Decontamination as per GHD procedure? Y <u>N</u> Was sampling equipment pre-cleaned? Y <u>N</u> COC updated? Y <u>N</u>	<table border="1"> <thead> <tr> <th>Parameters</th> <th>BTEX</th> <th>TPH</th> <th>PAH</th> <th>CHC</th> <th>PCB</th> <th>OCP</th> <th>OPP</th> <th>Tot. Metal</th> <th>Biol.</th> <th>Other</th> </tr> </thead> <tbody> <tr> <td>Preservatives</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.	Other	Preservatives										
Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.	Other													
Preservatives																							

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack



# Purging and Sampling Record

Bore ID: MW302R

Job Information	Sampling Information	Bore Information
Client: Aurizon	Purge Method: MP <u>Peri</u>	SWL(mbTOC): <u>1.54</u> m Logic Check: N/A
Project: TSF Hexham Compliance Monitoring	Sample Method: MP <u>Peri</u>	Screen: From: N/A m Stick Up: as prev. round
Proj. No.: 12584780	WQ Meter Type: ProDSS	NAPL Check: <u>NO</u> Bore Diam.: <u>50 mm</u>
Sampler: <u>LP</u> / NF	Flow Cell: Y Pump Depth: ----	Ref.datum: TOC Well Cap Secure? <u>YES</u>
Date: 22/03/2023	WLevel Meter Type: Dip / Fox ( <u>Int.Fce</u> ) Gge	Bore Depth: <u>as prev. round</u> m PID...N/A
Round: Q1	Field Filtered? <u>Y</u> / N (filter vessel, <u>disposable filter</u> / syringe)	

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec. Cond (µS/cm)	Dis. Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m TOC)	<u>WQ</u> (L/min)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
08:30	0.5	20.1	6.06	3517	0.73	-31.0	1.78	251.7	No odour, No sheen, Slightly yellow (to clear)
08:33	1.0	20.2	5.96	3510	0.26	-28.0	1.83	200.1	Slight turbid, No sediment
08:36	1.5	20.5	5.89	3500	0.16	-27.9	1.89	312.9	
08:39	2.0	20.7	5.87	3486	0.02	-30.2	1.91	237.7	
08:42	2.5	20.9	5.86	3470	0.01	-33.2	1.93	212.6	
08:45	3.0	21.0	5.87	3424	0.00	-37.0	1.94	191.12	

<p>Field QA Checks:</p> <p>Air bubbles in vials? Y <u>N</u> Any violent reactions? Y <u>N</u></p> <p>Decontamination as per GHD procedure? Y / N <u>Y</u></p> <p>Was sampling equipment pre-cleaned? Y / N <u>Y</u></p> <p>COC updated? Y / N <u>Y</u></p>	<table border="1"> <thead> <tr> <th>Parameters</th> <th>BTEX</th> <th>TPH</th> <th>PAH</th> <th>CHC</th> <th>PCB</th> <th>OCP</th> <th>OPP</th> <th>Tot. Metal</th> <th>Biol.</th> <th><u>TOC</u></th> </tr> </thead> <tbody> <tr> <td>Preservatives</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td><u>8</u></td> </tr> </tbody> </table>	Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.	<u>TOC</u>	Preservatives										<u>8</u>
Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.	<u>TOC</u>													
Preservatives										<u>8</u>													

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc  
+ F001, + F002

Purge Volumes  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack



# Purging and Sampling Record

Bore ID: MW307R

<b>Job Information</b> Client: Aurizon Project: TSF Hexham Compliance Monitoring Proj. No.: 12584780 Sampler: LP / NF Date: 22/03/2023 Round: Q1		<b>Sampling Information</b> Purge Method: MP <u>Peri</u> Sample Method: MP <u>Peri</u> WQ Meter Type: ProDSS Flow Cell: Y Pump Depth: ----- WLevel Meter Type: Dip / Fox <u>Int.Fce</u> Gge Field Filtered? <u>Y</u> <u>N</u> (filter vessel, <u>disposable filter</u> /syringe)		<b>Bore Information</b> SWL(mbTOC): <u>1.74</u> m Logic Check: N/A Screen: From: N/A m Stick Up: as prev. round NAPL Check:..... Bore Diam.: 50 mm Ref.datum: TOC Well Cap Secure?..... Bore Depth: <u>5.98</u> m PID...N/A	
--	--	--	--	--	--

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (.....)	Dis.Oxygen (.....)	Ox-Red Pt (± mV)	SWL (m TOC)	(.....)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
11:00	0.5	19.9	7.21	29824	0.45	-64.4	2.18		Strong hydrogen sulfide odour
	1.0	19.9	7.22	29472	0.36	-52.4	2.20		
	1.5	20.1	7.22	29149	0.25	-51	2.42		
	2.0	20.6	7.22	28855	0.37	-52.9	2.77		
	2.5	20.7	7.22	29850	0.42	-57.6	2.90		
	3.0	20.1	7.23	29964	0.46	-69.5	3.12		

**Field QA Checks:**  
 Air bubbles in vials? Y N Any violent reactions? Y N  
 Decontamination as per GHD procedure? Y N  
 Was sampling equipment pre-cleaned? Y N  
 COC updated? Y N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.					
Preservatives														

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc  
SWL not stabilising at lowest flow

*Purge Volumes*  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack



# Purging and Sampling Record

Bore ID: MW308R

Job Information	Sampling Information	Bore Information
Client: Aurizon	Purge Method: MP <u>Peri</u>	SWL(mbTOC): <u>0.93</u> m Logic Check: N/A
Project: TSF Hexham Compliance Monitoring	Sample Method: MP <u>Peri</u>	Screen: From: N/A m Stick Up: as prev. round
Proj. No.: 12584780	WQ Meter Type: ProDSS	NAPL Check: <u>N/A</u> Bore Diam.: 50 mm
Sampler: LP / NF	Flow Cell: Y Pump Depth: _____	Ref.datum: TOC Well Cap Secure? <u>N</u>
Date: 22/03/2023	WLevel Meter Type: Dip / Fox <u>Int.Fce</u> / Gge	Bore Depth: <u>3.94</u> m PID...N/A
Round: Q1	Field Filtered? <u>Y</u> / <u>N</u> (filter vessel, <u>disposable filter</u> / syringe)	

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (.....)	Dis.Oxygen (.....)	Ox-Red Pt. (± mV)	SWL (m TOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):	-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
9:47	0.5	20.3	6.46	8024	0.35	0.3	1.26	
9:49	1.0	20.4	6.45	7846	0.38	-8.4	1.39	
9:51	1.5	20.6	6.42	7274	0.84	-22.5	1.49	
9:52	2.0	20.5	6.38	6911	1.09	-30.6	1.60	
9:54	2.5	21.0	6.36	6351	1.35	-39.7	1.74	
9:56	3.0	21.2	6.36	5684	1.52	-42.2	1.83	
9:58	3.5	21.4	6.34	5378	1.69	-40.8	1.98	Hydrogen Sulfide odour, turbid, trace black sediments, grey/brown. no sheen.

**Field QA Checks:**

Air bubbles in vials? Y N Any violent reactions? Y N

Decontamination as per GHD procedure? Y N

Was sampling equipment pre-cleaned? Y N

COC updated? Y N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.				
Preservatives													

**Comment:** Duplicate samples collected, bottles used, access, condition of headworks etc

**Purge Volumes**  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack





# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID... Basin 1

PROJECT NO. 12584780 DATE: 22/03/2023  
 PROJECT NAME: Aurizon TSF Hexham Monitoring TIME: 11:30  
 CLIENT: Aurizon SAMPLING OFFICER: LF

COORDINATES/GPS (If Applicable) \_\_\_\_\_  
 SAMPLING METHOD (ie grab, bucket) Grab  
 DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

### ENVIRONMENTAL OBSERVATIONS

WEATHER Sunny  
 VEGETATION reeds along bank  
 SLOPE -  
 EROSION -  
 OTHER \_\_\_\_\_

### FIELD MEASUREMENTS

TEMPERATURE (°C): 19.8 CONDUCTIVITY (uS/cm): 1179  
 pH: 7.41 DO (mg/L): 0.09  
 REDOX (mV): -153 Turbidity (NTU): 108.95  
 Sheen, Colour, Odour. No sheen, Brown, turbid, lots of duck weed and  
 Sediment Description organic matter, leaves/sticks, Black sediment. No moderate Sulfur odour

### HYDROLOGICAL DATA

FLOW MEASUREMENT (or stream height if rating table available) clm  
 CROSS SECTION WIDTH (m) >1m  
 DEPTH (m) clm  
 OTHER -

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
<u>Basin 1</u>	<u>8</u>	<u>ICE</u>	<u>✓</u>	<u>✓</u>



# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID: Basin 2

PROJECT NO. 12584788 DATE: 22/03/2023  
 PROJECT NAME: Aurizon TSF Hexham Monitoring TIME: 07:30  
 CLIENT: Aurizon SAMPLING OFFICER: LP

COORDINATES/GPS (if Applicable) \_\_\_\_\_  
 SAMPLING METHOD (ie grab, bucket) Grab  
 DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

ENVIRONMENTAL OBSERVATIONS  
 WEATHER \_\_\_\_\_  
 VEGETATION \_\_\_\_\_  
 SLOPE \_\_\_\_\_  
 EROSION \_\_\_\_\_  
 OTHER \_\_\_\_\_

DRY

FIELD MEASUREMENTS  
 TEMPERATURE (°C): \_\_\_\_\_ CONDUCTIVITY (uS/cm): \_\_\_\_\_  
 pH: \_\_\_\_\_ DO (mg/L): \_\_\_\_\_  
 REDOX (mV): \_\_\_\_\_ Turbidity (NTU): \_\_\_\_\_  
 Sheen, Colour, Odour, \_\_\_\_\_  
 Sediment Description \_\_\_\_\_

HYDROLOGICAL DATA  
 FLOW MEASUREMENT  
 (or stream height if rating table available) \_\_\_\_\_  
 CROSS SECTION WIDTH (m) \_\_\_\_\_  
 DEPTH (m) \_\_\_\_\_  
 OTHER \_\_\_\_\_

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS



# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID... Basin 3

PROJECT NO. 12584780 DATE: 22/03/2023  
 PROJECT NAME: Aurizon TSF Hexham Monitoring TIME: 8:35 am  
 CLIENT: Aurizon SAMPLING OFFICER: NF

COORDINATES/GPS (if Applicable) \_\_\_\_\_  
 SAMPLING METHOD (ie grab, bucket) Grab  
 DETAILED SAMPLE LOCATION DESCRIPTION Ware at basin 3

### ENVIRONMENTAL OBSERVATIONS

WEATHER clear  
 VEGETATION reeds  
 SLOPE gentle  
 EROSION No  
 OTHER \_\_\_\_\_

### FIELD MEASUREMENTS

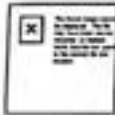
TEMPERATURE (°C): 19.1 CONDUCTIVITY (uS/cm): 1901  
 pH: 6.98 DO (mg/L): 0.29  
 REDOX (mV): -222.8 Turbidity (NTU): 26.7

Sheen, Colour, Odour, Slight bacterial sheen, algae growth  
 Sediment Description on surface, no odour, clear with yellow tinge with heavy black sediments

### HYDROLOGICAL DATA

FLOW MEASUREMENT (or stream height if rating table available) \_\_\_\_\_  
 CROSS SECTION WIDTH (m) \_\_\_\_\_  
 DEPTH (m) \_\_\_\_\_  
 OTHER \_\_\_\_\_

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
<u>Basin 3</u>	<u>2</u>	<u>ice</u>		



# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID: Basin 1

PROJECT NO. 12584780 DATE: 18/04/2023 / /

PROJECT NAME: Aurizon Hexham TIME: \_\_\_\_\_

CLIENT: Aurizon SAMPLING OFFICERS: NF

SITE: \_\_\_\_\_

COORDINATES/GPS (if Applicable) \_\_\_\_\_

SAMPLING METHOD (ie grab, bucket) Grab

DETAILED SAMPLE LOCATION DESCRIPTION Basin 1

### ENVIRONMENTAL OBSERVATIONS

WEATHER reeds Sunny

VEGETATION reeds

SLOPE gentle

EROSION \_\_\_\_\_

OTHER \_\_\_\_\_

### FIELD MEASUREMENTS

TEMPERATURE (°C): 16.7 CONDUCTIVITY (uS/cm): 1002

pH: 7.4 DO (mg/L; % sat.): 1.04

REDOX (mV): -165.4 Turbidity (NTU) 29.05

Sheen, Colour, Odour. duck weed growth on surface, moderate

Sediment Description H2S odour, no sheen, dark coloured,

Slightly turbid

### HYDROLOGICAL DATA

FLOW MEASUREMENT (or stream height if rating table available) no flow

CROSS SECTION WIDTH (m) \_\_\_\_\_

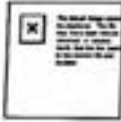
DEPTH (m) 0.30m

OTHER \_\_\_\_\_

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
	<u>NO</u>			<u>sampling</u>

FIELD SUPERVISOR \_\_\_\_\_

CHECKED (SIGN & DATE) \_\_\_\_\_



# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID... Basin 2

PROJECT NO. 12584780 DATE: 18/04/2023 1

PROJECT NAME: Aurizon Hexham TIME: \_\_\_\_\_

CLIENT: Aurizon SAMPLING OFFICERS: NF

SITE: \_\_\_\_\_

COORDINATES/GPS (if Applicable) \_\_\_\_\_

SAMPLING METHOD (ie grab, bucket) Grab

DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

## ENVIRONMENTAL OBSERVATIONS

WEATHER \_\_\_\_\_

VEGETATION \_\_\_\_\_

SLOPE \_\_\_\_\_

EROSION \_\_\_\_\_

OTHER \_\_\_\_\_

## FIELD MEASUREMENTS

TEMPERATURE (°C): \_\_\_\_\_ CONDUCTIVITY (uS/cm): \_\_\_\_\_

pH: \_\_\_\_\_ DO (mg/L; % sat.): \_\_\_\_\_

REDOX (mV): \_\_\_\_\_ Turbidity (NTU): \_\_\_\_\_

Sheen, Colour, Odour, \_\_\_\_\_

Sediment Description \_\_\_\_\_

## HYDROLOGICAL DATA

FLOW MEASUREMENT  
(or stream height if rating table available) \_\_\_\_\_

CROSS SECTION WIDTH (m) \_\_\_\_\_

DEPTH (m) \_\_\_\_\_

OTHER \_\_\_\_\_

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS

FIELD SUPERVISOR \_\_\_\_\_

CHECKED (SIGN & DATE) \_\_\_\_\_

*Not monitored due to overgrowth and known snake in area.*



# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID: Basin 3

PROJECT NO. 12584780 DATE: 18/04/2023 / /  
 PROJECT NAME: Aurizon Hexham TIME: \_\_\_\_\_  
 CLIENT: Aurizon SAMPLING OFFICERS: NF  
 SITE: \_\_\_\_\_

COORDINATES/GPS (if Applicable) \_\_\_\_\_  
 SAMPLING METHOD (ie grab, bucket) Grab  
 DETAILED SAMPLE LOCATION DESCRIPTION Basin 3

ENVIRONMENTAL OBSERVATIONS  
 WEATHER Sunny  
 VEGETATION reed / overgrown grass  
 SLOPE gentle  
 EROSION \_\_\_\_\_  
 OTHER \_\_\_\_\_

FIELD MEASUREMENTS  
 TEMPERATURE (°C): 16.1 CONDUCTIVITY (uS/cm): 1471  
 pH: 7.9 DO (mg/L; % sat): 1.0  
 REDOX (mV): -175.4 Turbidity (NTU) 30.52  
 Sheen, Colour, Odour, Slight H2S odour, trace bacterial  
 Sediment Description sheen, slightly turbid dark brown/black

HYDROLOGICAL DATA  
 FLOW MEASUREMENT (or stream height if rating table available) NO flow  
 CROSS SECTION WIDTH (m) \_\_\_\_\_  
 DEPTH (m) 0.40 cm  
 OTHER \_\_\_\_\_

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
<u>NO samples taken during monthly</u>				

FIELD SUPERVISOR \_\_\_\_\_ CHECKED (SIGN & DATE) \_\_\_\_\_



# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID: Basin 3

PROJECT NO. 12584780 DATE: 4/05/2023  
 PROJECT NAME: Aurizon TSF Hexham Monitoring TIME: 12:00  
 CLIENT: Aurizon SAMPLING OFFICER: LP

COORDINATES/GPS (if Applicable) \_\_\_\_\_  
 SAMPLING METHOD (ie grab, bucket) Grab  
 DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

ENVIRONMENTAL OBSERVATIONS  
 WEATHER Fine  
 VEGETATION Reeds in pond, along bank  
 SLOPE -  
 EROSION -  
 OTHER \_\_\_\_\_

FIELD MEASUREMENTS  
 TEMPERATURE (°C): 13.6 CONDUCTIVITY (uS/cm): 1335  
 pH: 6.9 DO (mg/L): ~~11.4~~ 0.85 0.8  
 REDOX (mV): -60.6 Turbidity (NTU): 31.6  
 Sheen, Colour, Odour: \_\_\_\_\_

Sediment Description Duck weed on surface, some vegetation, turbid, slight, Brown  
No sheen, No odour.

HYDROLOGICAL DATA  
 FLOW MEASUREMENT (or stream height if rating table available) < 1m/min  
 CROSS SECTION WIDTH (m) > 1m  
 DEPTH (m) > 1m  
 OTHER \_\_\_\_\_

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
<u>Basin 3</u>	<u>- Field Parameters only -</u>	<u>-</u>	<u>NO sample -</u>	<u>-</u>



# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID... <sup>at 14/10</sup> Basin 1

PROJECT NO. 12584780 DATE: 4/05/2023  
 PROJECT NAME: Aurizon TSF Hexham Monitoring TIME: 12:25  
 CLIENT: Aurizon SAMPLING OFFICER: LB

COORDINATES/GPS (if Applicable)  
 SAMPLING METHOD (ie grab, bucket) Grab  
 DETAILED SAMPLE LOCATION DESCRIPTION

### ENVIRONMENTAL OBSERVATIONS

WEATHER: Fine  
 VEGETATION: reeds in pond, along Bank,  
 SLOPE: -  
 EROSION: -  
 OTHER:

### FIELD MEASUREMENTS

TEMPERATURE (°C): 14.1 CONDUCTIVITY (uS/cm): 962  
 pH: 6.8 DO (mg/L): 1.1  
 REDOX (mV): -102.2 Turbidity (NTU): 9.9  
 Sheen, Colour, Odour:

Sediment Description: Duck weed on water surface, Slight Bacterial sheen, turbid  
 Brown, NO odour

### HYDROLOGICAL DATA

FLOW MEASUREMENT (or stream height if rating table available) <math>\lt; 1\text{m}/\text{min}</math>  
 CROSS SECTION WIDTH (m) 7m  
 DEPTH (m) 1m  
 OTHER:

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
- Basin 1	- No Sample			Field Parameters Only -





# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID... Bank 2

PROJECT NO. 12584780 DATE: 4/05/2023  
PROJECT NAME: Aurizon TSF Hexham Monitoring TIME: 13:00  
CLIENT: Aurizon SAMPLING OFFICER: \_\_\_\_\_

COORDINATES/GPS (if Applicable) \_\_\_\_\_  
SAMPLING METHOD (ie grab, bucket) Grab  
DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

## ENVIRONMENTAL OBSERVATIONS

WEATHER \_\_\_\_\_  
VEGETATION \_\_\_\_\_  
SLOPE \_\_\_\_\_  
EROSION \_\_\_\_\_  
OTHER \_\_\_\_\_

DRY

## FIELD MEASUREMENTS

TEMPERATURE (°C): \_\_\_\_\_ CONDUCTIVITY (uS/cm): \_\_\_\_\_  
pH: \_\_\_\_\_ DO (mg/L) \_\_\_\_\_  
REDOX (mV): \_\_\_\_\_ Turbidity (NTU) \_\_\_\_\_  
Sheen, Colour, Odour, \_\_\_\_\_  
Sediment Description \_\_\_\_\_

## HYDROLOGICAL DATA

FLOW MEASUREMENT  
(or stream height if rating table available) \_\_\_\_\_  
CROSS SECTION WIDTH (m) \_\_\_\_\_  
DEPTH (m) \_\_\_\_\_  
OTHER \_\_\_\_\_

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
<u>- DRY</u>	<u>-</u>	<u>No</u>	<u>Field Parameters -</u>	



SURFACE WATER  
SAMPLING RECORD

PROJECT NO.	12611010	SURFACE WATER ID	Basin 1
PROJECT NAME	Aurizon TSF Hexham Monitoring	DATE	27/6/2023
CLIENT	Aurizon	TIME	11:00
SITE	Aurizon Hexham	LOGGED BY	LP
COORDINATES/GPS (if applicable)	N/A		
SAMPLING METHOD (e.g. grab, bucket)			
DETAILED SAMPLE LOCATION DESCRIPTION			

ENVIRONMENTAL OBSERVATIONS

WEATHER	Fine - Windy
VEGETATION	Reeds on bank, Duck weed on water surface
SLOPE	-
EROSION	-
OTHER (colour, sheen, odour, turbidity, sediment)	pale yellow to clear, Non-turbid, black sediment, algae and duck weed with shredded vegetation (leaves, plants) NO odour, NO sheen

FIELD MEASUREMENTS

TEMPERATURE (°C)	9.1
pH	7.97
SPC / EC (µS/cm)	1169
DO (ppm) mg/L	<del>1.33</del> 2.02 27/6/23
REDOX (mV)	-133
Turbidity (NTU)	2.53

HYDROLOGICAL DATA

FLOW MEASUREMENT	cm/min
CROSS SECTION WIDTH (m)	7m
DEPTH (m)	7m
OTHER	

SAMPLE NO.	NO. CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
Basin 1	8	ICE	-	as above

FIELD SUPERVISOR	LP	CHECKED (SIGN & DATE)	27/6/2023
------------------	----	-----------------------	-----------



# SURFACE WATER SAMPLING RECORD

PROJECT NO.	12611010	SURFACE WATER ID	Basin 2
PROJECT NAME	Aurizon TSE Hexham Monitoring	DATE	27/6/2023
CLIENT	Aurizon	TIME	
SITE	Aurizon Hexham	LOGGED BY	
COORDINATES/GPS (if applicable)	N/A		
SAMPLING METHOD (e.g. grab, bucket)			
DETAILED SAMPLE LOCATION DESCRIPTION			

## ENVIRONMENTAL OBSERVATIONS

WEATHER \_\_\_\_\_

VEGETATION \_\_\_\_\_

SLOPE \_\_\_\_\_

EROSION \_\_\_\_\_

OTHER (colour, sheen, odour, turbidity, sediment) \_\_\_\_\_

DRY

## FIELD MEASUREMENTS

TEMPERATURE (°C) \_\_\_\_\_

pH \_\_\_\_\_

SPC / EC (µS/cm) \_\_\_\_\_

DO (ppm) \_\_\_\_\_

REDOX (mV) \_\_\_\_\_

## HYDROLOGICAL DATA

FLOW MEASUREMENT \_\_\_\_\_

CROSS SECTION WIDTH (m) \_\_\_\_\_

DEPTH (m) \_\_\_\_\_

OTHER \_\_\_\_\_

SAMPLE NO.	NO. CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

FIELD SUPERVISOR \_\_\_\_\_ CHECKED (SIGN & DATE) \_\_\_\_\_ / / 2023



# SURFACE WATER SAMPLING RECORD

PROJECT NO.	12611010	SURFACE WATER ID	Basin 3
PROJECT NAME	Aurizon TSF Hexham Monitoring	DATE	27/6/2023
CLIENT	Aurizon	TIME	11:15
SITE	Aurizon Hexham	LOGGED BY	NF
COORDINATES/GPS (if applicable)	N/A		
SAMPLING METHOD (e.g. grab, bucket)	grab		
DETAILED SAMPLE LOCATION DESCRIPTION			

## ENVIRONMENTAL OBSERVATIONS

WEATHER	
VEGETATION	fine reeds/grasses
SLOPE	gentle
EROSION	no
OTHER (colour, sheen, odour, turbidity, sediment)	Trace bacterial sheen, some algae growth on water surface, strong H <sub>2</sub> S odour, Black, turbid, black seeds.

## FIELD MEASUREMENTS

TEMPERATURE (°C)	9.3
pH	7.0
SPC / EC (µS/cm)	1647
DO (ppm)	3.3
REDOX (mV)	-213.7
NTU	<del>27.3</del> 42.3

## HYDROLOGICAL DATA

FLOW MEASUREMENT	no flow
CROSS SECTION WIDTH (m)	
DEPTH (m)	0.3m
OTHER	

SAMPLE NO.	NO. CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
Basin 3	7	ice	<input checked="" type="checkbox"/>	

FIELD SUPERVISOR	CHECKED (SIGN & DATE)	/ / 2023
------------------	-----------------------	----------



# Purging and Sampling Record

Bore ID: 101R

<b>Job Information</b>		<b>Sampling Information</b>			<b>Bore Information</b>		
Client: Aurizon		Purge Method: MP <input checked="" type="radio"/> Peri	SWL(mbTOC): <u>2.01</u> m		Logic Check: N/A		
Project: TSF Hexham Compliance Monitoring		Sample Method: MP <input checked="" type="radio"/> Peri	Screen: From: N/A m		Stick Up: as prev. round		
Proj. No.: 12611010		WQ Meter Type: ProDSS	NAPL Check: <u>NO</u>		Bore Diam.: 50 mm		
Sampler: <input checked="" type="radio"/> LP / <input type="radio"/> NF		Flow Cell: Y	Pump Depth: -----		Ref.datum: TOC		
Date: 27/06/2023		WLevel Meter Type: Dip / Fox / <input checked="" type="radio"/> Int.Fce / <input type="radio"/> Gge	Bore Depth: <u>5.43</u> m		Well Cap Secure? <u>Yes</u>		
Round: Q2		Field Filtered? <input checked="" type="radio"/> Y / <input type="radio"/> N (filter vessel, <input checked="" type="radio"/> disposable filter / <input type="radio"/> syringe)					PID...N/A

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µS/cm)	Dis.Oxygen (% sat)	Ox-Red Pt. (± mV)	SWL (m TOC)	Turbidity (NTU)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate
Stable when (3 consecutive readings)		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
09:00	0.5	19.4	6.34	9155	1.14	-11	2.24	47	No odour, No sheen pale orange, trace
09:03	1.0	19.8	6.42	9274	0.42	-35	2.30	43	orange algae, Moderately turbid
09:06	1.5	19.6	6.42	9144	0.26	-56	2.37	46	
09:09	2.0	19.5	6.44	9087	0.20	-64	2.44	46	
09:12	2.5	19.6	6.45	9110	0.17	-69	2.47	50	
09:15	3.0	19.7	6.46	9134	0.16	-72	2.50	51	

**Field QA Checks:**

Air bubbles in vials?  Y /  N

Any violent reactions?  Y /  N

Decontamination as per GHD procedure?  Y /  N

Was sampling equipment pre-cleaned?  Y /  N

COC updated?  Y /  N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.				
Preservatives													

**Comment:** Duplicate samples collected, bottles used, access, condition of headworks etc

**Purge Volumes**  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack



# Purging and Sampling Record

Bore ID: MWO1R

Job Information	Sampling Information	Bore Information
Client: Aurizon	Purge Method: MP <u>Peri</u>	SWL(mbTOC): <u>1.23</u> m Logic Check: N/A
Project: TSF Hexham Compliance Monitoring	Sample Method: MP <u>Peri</u>	Screen: From: N/A m Stick Up: as prev. round
Proj. No.: 12611010	WQ Meter Type: ProDSS	NAPL Check: <u>N/A</u> Bore Diam.: 50 mm
Sampler: LP / NF	Flow Cell: Y Pump Depth: -----	Ref.datum: TOC Well Cap Secure? <u>✓</u>
Date: 27/06/2023	WLevel Meter Type: Dip / Fox <u>Int.Fce</u> Gge	Bore Depth: <u>4.32</u> m PID...N/A
Round: Q2	Field Filtered? <u>Y</u> / <u>N</u> (filter vessel, <u>disposable filter/syringe</u> )	

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (.....)	Dis.Oxygen (.....)	Ox-Red Pt. (± mV)	SWL (m TOC)	( <u>NFU</u> )	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate
Stable when (3 consecutive readings):			+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
10:41	0.5	14.7	5.0	4160	1.1	3.5	1.60	22.4	
	1.0	14.7	4.9	4136	0.8	4.3	1.67	14.8	
10:46	1.5	14.7	5.0	4177	0.6	3.9	1.70	15.6	
	2.0	14.9	5.0	4222	0.5	4.1		15.8	
10:55	2.5	14.6	6	8617	0.4	-75.8	2.06	11.9	water level got below pump had to pause to adjust tubing.
	3.0	17.6	6	8245	0.3	-72.0	2.13	10.4	
10:58	3.5	17.5	5.9	7983	0.2	-66.0	2.19	10.4	
10:59	4.0	17.4	5.9	7726	0.2	-63.9	2.24	13.8	clear, colourless, trace grass seds, <sup>trace H2S odour</sup> <del>no odour</del> , no sheen

Field QA Checks: Air bubbles in vials? Y / <u>N</u> Any violent reactions? Y / <u>N</u> Decontamination as per GHD procedure? Y / <u>N</u> Was sampling equipment pre-cleaned? Y / <u>N</u> COC updated? Y / <u>N</u>	<table border="1"> <tr> <th>Parameters</th> <th>BTEX</th> <th>TPH</th> <th>PAH</th> <th>CHC</th> <th>PCB</th> <th>OCP</th> <th>OPP</th> <th>Tot. Metal</th> <th>Biol.</th> </tr> <tr> <td>Preservatives</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.	Preservatives									
Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.												
Preservatives																					

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack



# Purging and Sampling Record

Bore ID: MW02

Job Information	Sampling Information	Bore Information
Client: Aurizon	Purge Method: MP <u>Peri</u>	SWL(mbTOC): <u>1.80</u> m
Project: TSF Hexham Compliance Monitoring	Sample Method: MP <u>Peri</u>	Logic Check: N/A
Proj. No.: 12611010	WQ Meter Type: ProDSS	Screen: From: N/A m
Sampler: LP / NF	Flow Cell: Y	NAPL Check: <u>N/A</u>
Date: 27/06/2023	Pump Depth: <u>2</u>	Bore Diam.: 50 mm
Round: Q2	WLevel Meter Type: Dip / Fox <u>Int.Fce</u> / Gge	Ref.datum: TOC
	Field Filtered? <u>Y</u> / N (filter vessel, <u>disposable filter/syringe</u> )	Bore Depth: <u>2.68</u> m
		Well Cap Secure? <u>Y</u>
		PID...N/A

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (.....)	Dis.Oxygen (.....)	Ox-Red Pt. (± mV)	SWL (m TOC)	( <u>NTU</u> )	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate
Stable when (3 consecutive readings):									
		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
12:06	0.5	18.8	5.1	1920	0.5	44.8	1.80	142.5	
	1.0	18.9	5.1	1919	0.3	46.0	1.82	88.5	
12:07	1.5	19.0	5.1	1919	0.3	46.3	1.82	74.5	
12:08	2.0	19.0	5.1	1919	0.2	46.1	1.82	46.7	
12:10	2.5	19.0	5.1	1919	0.2	46.1	1.82	38.2	
12:11	3.0	19.0	5.1	1918	0.2	46.3	1.82	36.9	Slightly turbid, orange/brown, no sheen, no odour

Field QA Checks:	
Air bubbles in vials? <u>Y</u> / N	Any violent reactions? <u>Y</u> / N
Decontamination as per GHD procedure? <u>Y</u> / N	
Was sampling equipment pre-cleaned? <u>Y</u> / N	
COC updated? <u>Y</u> / N	

Parameters:	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.				
Preservatives													

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack



# Purging and Sampling Record

Bore ID: MW101R

Job Information	Sampling Information	Bore Information
Client: Aurizon	Purge Method: MP <u>Peri</u>	SWL(mbTOC): <u>0.79</u> m
Project: TSF Hexham Compliance Monitoring	Sample Method: MP <u>Peri</u>	Logic Check: N/A
Proj. No.: 12611010	WQ Meter Type: ProDSS	Screen: From: N/A m
Sampler: LP / NF	Flow Cell: Y	NAPL Check: <u>N/A</u>
Date: 27/06/2023	Pump Depth: <u>2</u>	Bore Diam.: 50 mm
Round: Q2	WLevel Meter Type: Dip / Fox <u>Int.Fce</u> / Gge	Well Cap Secure? <u>Y</u>
	Field Filtered? <u>Y</u> / N (filter vessel, <u>disposable filter/syringe</u> )	Ref.datum: TOC <u>3.08</u>
		Bore Depth: <u>3.08</u> m
		PID...N/A

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (.....)	Dis.Oxygen (.....)	Ox-Red PL (± mV)	SWL (m TOC)	<u>NTU</u>	Comment:
Stable when (3 consecutive readings):									
			+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
	0.5	17.0	6.3	26281	0.8	-93.8	0.84	186.4	Ants in well
	1.0	16.8	6.3	26038	0.4	-91.2	0.84	181.4	
	1.5	16.8	6.3	25793	0.3	-87.6	0.84	160.3	
	2.0	16.1	6.3	25469	0.2	-75.6	0.84	165.9	
	2.5	15.4	6.2	24913	0.2	-62.2	0.84	150.9	
	3.0	15.1	6.2	24503	0.2	-44.2	0.84	102.1	
	3.5	15.1	6.1	24458	0.2	-40.5	0.84	98.9	Turbid, brown/orange, no sheen, no odour, ants / ant eggs

Field QA Checks: Air bubbles in vials? Y / N <u>N</u> Any violent reactions? Y / N <u>N</u> Decontamination as per GHD procedure? Y / N <u>Y</u> Was sampling equipment pre-cleaned? Y / N <u>Y</u> COC updated? Y / N <u>Y</u>	<table border="1"> <tr> <th>Parameters</th> <th>BTEX</th> <th>TPH</th> <th>PAH</th> <th>CHC</th> <th>PCB</th> <th>OCP</th> <th>OPP</th> <th>Tot. Metal</th> <th>Biol.</th> </tr> <tr> <td>Preservatives</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.	Preservatives									
Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.												
Preservatives																					

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

**RBOZ taken off IP**

Purge Volumes  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack





# Purging and Sampling Record

Bore ID: MW106R

Job Information	Sampling Information	Bore Information
Client: Aurizon Project: TSF Hexham Compliance Monitoring Proj. No.: 12611010 Sampler: <u>LP</u> / NF Date: 27/06/2023 Round: Q2	Purge Method: MP <u>Peri</u> Sample Method: MP <u>Peri</u> WQ Meter Type: ProDSS Flow Cell: Y Pump Depth: ---- WLevel Meter Type: Dip / Fox / <u>Int.Fce</u> / Gge Field Filtered? <u>Y</u> / N (filter vessel, <u>disposable filter/syringe</u> )	SWL(mbTOC): <u>1.46</u> m Screen: From: N/A m NAPL Check: <u>NO</u> Ref.datum: TOC Bore Depth: <u>3.34</u> m Logic Check: N/A Stick Up: as prev. round Bore Diam.: 50 mm Well Cap Secure? <u>Yes</u> PID...N/A

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec. Cond ( <u>SPC</u> )	Dis. Oxygen ( <u>mg/L</u> )	Ox-Red Pt. (± mV)	SWL (m TOC)	Turbidity ( <u>NTU</u> )	Comment:
Stable when (3 consecutive readings)		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		Colour, turbidity, sediment load, sheen, odour, flow rate
09:55	0.5	16.7	7.37	732	1.50	-9	1.55	89	No colour, No sheen, clear to pale yellow, algae, vegetation (stick/grass), slight turbid.
09:58	1.0	16.7	7.20	640	0.92	2	1.57	92	
10:01	1.5	16.6	7.12	634	0.75	7	1.57	91	
10:04	2.0	16.5	7.04	542	0.55	14	1.58	111	
10:07	2.5	16.5	7.02	<del>14</del> 645	0.53	16	1.58	114	
10:10	3.0	16.3	7.00	655	0.47	17	1.5	122	

<p><b>Field QA Checks:</b></p> <p>Air bubbles in vials? <u>Y</u> / <u>N</u> Any violent reactions? <u>Y</u> / <u>N</u></p> <p>Decontamination as per GHD procedure? <u>Y</u> / <u>N</u></p> <p>Was sampling equipment pre-cleaned? <u>Y</u> / <u>N</u></p> <p>COC updated? <u>Y</u> / <u>N</u></p>	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">Parameters</th> <th style="width: 5%;">BTEX</th> <th style="width: 5%;">TPH</th> <th style="width: 5%;">PAH</th> <th style="width: 5%;">CHC</th> <th style="width: 5%;">PCB</th> <th style="width: 5%;">OCP</th> <th style="width: 5%;">OPP</th> <th style="width: 5%;">Tot. Metal</th> <th style="width: 5%;">Biol.</th> <th style="width: 5%;"></th> <th style="width: 5%;"></th> <th style="width: 5%;"></th> </tr> </thead> <tbody> <tr> <td>Preservatives</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </tbody> </table>	Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.				Preservatives												
Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.																		
Preservatives																											

**Comment:** Duplicate samples collected, bottles used, access, condition of headworks etc

**Purge Volumes**

Casing Int. Dia (mm)	50	100	150
Vol (L/m of casing)	2.0	7.9	17.7

\*Double for gravel pack



# Purging and Sampling Record

Bore ID: MW108R

Job Information	Sampling Information	Bore Information
Client: Aurizon	Purge Method: MP <u>Peri</u>	SWL(mbTOC): <u>2.265</u> m
Project: TSF Hexham Compliance Monitoring	Sample Method: MP <u>Peri</u>	Screen: From: N/A m
Proj. No.: 12611010	WQ Meter Type: ProDSS	NAPL Check: <u>N/A</u>
Sampler: LP / NF	Flow Cell: Y Pump Depth: -----	Ref.datum: TOC
Date: 27/06/2023	WLevel Meter Type: Dip / Fox <u>Int.Fce</u> / Gge	Bore Depth: <u>2.995</u> m
Round: Q2	Field Filtered? <u>Y/N</u> (filter vessel, <u>disposable filter/syringe</u> )	Logic Check: N/A
		Stick Up: as prev. round
		Bore Diam.: 50 mm
		Well Cap Secure? <u>✓</u>
		PID...N/A

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (.....)	Dis.Oxygen (.....)	Ox-Red Pt. (± mV)	SWL (m TOC)	<u>NTU</u> (.....)	Comment:
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		Colour, turbidity, sediment load, sheen, odour, flow rate
9:19	0.5	17.2	6.3	3710	3.4	57.0	2.285	27.2	
9:20	1.0	17.1	6.2	3700	2.7	59.3	2.285	47.3	
9:22	1.5	17.4	6.1	3645	1.5	49.4	2.28	50.5	
9:23	2.0	17.4	6.1	3630	1.3	45.8	2.28	44.6	
9:25	2.5	17.4	6.1	3614	1.0	41.2	2.28	59.2	
9:26	3.0	17.4	6.1	3577	0.8	37.2	2.28	61.5	Turbid, brown, brown grass/algae sediments, no odour, no sheen

<p><b>Field QA Checks:</b></p> Air bubbles in vials? <u>Y/N</u> Any violent reactions? <u>Y/N</u> Decontamination as per GHD procedure? <u>Y/N</u> Was sampling equipment pre-cleaned? <u>Y/N</u> COC updated? <u>Y/N</u>	<table border="1"> <thead> <tr> <th>Parameters</th> <th>BTEX</th> <th>TPH</th> <th>PAH</th> <th>CHC</th> <th>PCB</th> <th>OCP</th> <th>OPP</th> <th>Tot. Metal</th> <th>Biol.</th> <th></th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>Preservatives</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.					Preservatives													
Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.																				
Preservatives																													

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

*Purge Volumes*  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack



# Purging and Sampling Record

Bore ID: MW109

Job Information	Sampling Information	Bore Information
Client: Aurizon	Purge Method: MP <u>(Peri)</u>	SWL(mbTOC): <u>2.21</u> m
Project: TSF Hexham Compliance Monitoring	Sample Method: MP <u>(Peri)</u>	Screen: From: N/A m
Proj. No.: 12611010	WQ Meter Type: ProDSS	NAPL Check: <u>No</u>
Sampler: <u>LP</u> / NF	Flow Cell: Y	Ref.datum: TOC
Date: 27/06/2023	Pump Depth: ----	Bore Depth: <u>3.39</u> m
Round: Q2	WLevel Meter Type: Dip / Fox / Int.Fce / Gge	Logic Check: N/A
	Field Filtered? <u>Y</u> / N (filter vessel, <u>disposable filter/syringe</u> )	Stick Up: as prev. round
		Bore Diam.: 50 mm
		Well Cap Secure? <u>No</u>
		PID...N/A

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec. Cond ( <u>µS/cm</u> )	Dis. Oxygen ( <u>mg/L</u> )	Ox-Red Pt. (± mV)	SWL (m TOC)	Turbidity ( <u>NTU</u> )	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
12:00	0.5	14.0	6.43	44469	10.00	127	2.31	300	No colour, No sheen, pale yellow,
12:03	1.0	18.3	7.59	4760	4.06	-42	2.45	307	algae, sediment, slightly turbid
12:06	1.5	18.5	7.16	4802	2.97	-103	2.54	305	*Multiple cows approached, very agitated, some had horns, some were very large, stopped purging - took samples and left area

Field QA Checks:																		
Air bubbles in vials? <u>Y</u> / N	Any violent reactions? <u>Y</u> / N																	
Decontamination as per GHD procedure? <u>Y</u> / N																		
Was sampling equipment pre-cleaned? <u>Y</u> / N																		
COC updated? <u>Y</u> / N																		

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc RBOI taken before this sample

Purge Volumes  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack



# Purging and Sampling Record

Bore ID: MW301R

Job Information	Sampling Information	Bore Information
Client: Aurizon	Purge Method: MP <u>Peri</u>	SWL(mbTOC): <u>0.67</u> m Logic Check: N/A
Project: TSF Hexham Compliance Monitoring	Sample Method: MP <u>Peri</u>	Screen: From: N/A m Stick Up: as prev. round
Proj. No.: <u>12611010</u>	WQ Meter Type: ProDSS	NAPL Check: <u>no</u> Bore Diam.: 50 mm
Sampler: <u>LP/NF</u>	Flow Cell: Y Pump Depth: -----	Ref.datum: TOC Well Cap Secure? <u>yes</u>
Date: 27/06/2023	WLevel Meter Type: Dip / Fox / <u>Int.Fce</u> / Ggs	Bore Depth: <u>4.92</u> m PID...N/A
Round: Q2	Field Filtered? <u>Y/N</u> (filter vessel, <u>disposable filter/syringe</u> )	

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec. Cond ( <u>SPC</u> )	Dis.Oxygen ( <u>mg/L</u> )	Ox-Red Pt. (± mV)	SWL (m TOC)	Turbidity (NTU)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
10:45	0.5	16.2	6.83	20997	3.61	-24	<del>105</del> 408	408	No odour, No sheen, Orange, moderately turbid
10:48	1.0	16.4	6.88	20535	3.25	-39	1.17	394	watery orange - No sediment, trace
10:51	1.5	16.5	6.91	17436	4.34	-54	1.27	1262	algae
10:54	2.0	16.3	6.89	17050	3.85	-54	1.29	1033	
10:57	2.5	16.4	6.89	16711	3.50	-55	1.29	856	
10:00	3.0	16.3	6.89	16452	3.29	-55	2.31	846	
11:03	3.5	16.3	6.89	16247	3.15	-54	2.34	822	

<b>Field QA Checks:</b> Air bubbles in vials? Y <u>N</u> Any violent reactions? Y <u>N</u> Decontamination as per GHD procedure? Y <u>N</u> Was sampling equipment pre-cleaned? Y <u>N</u> COC updated? Y <u>N</u>		<table border="1"> <thead> <tr> <th>Parameters</th> <th>BTEX</th> <th>TPH</th> <th>PAH</th> <th>CHC</th> <th>PCB</th> <th>OCP</th> <th>OPP</th> <th>Tot. Metal</th> <th>Biol.</th> <th></th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>Preservatives</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.					Preservatives													
Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.																					
Preservatives																														

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

**Purge Volumes**  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack



# Purging and Sampling Record

Bore ID: MW302R

Job Information	Sampling Information	Bore Information
Client: Aurizon	Purge Method: MP <input checked="" type="radio"/> Peri	SWL(mbTOC): <u>1.61</u> m Logic Check: N/A
Project: TSF Hexham Compliance Monitoring	Sample Method: MP <input checked="" type="radio"/> Peri	Screen: From: N/A m Stick Up: as prev. round
Proj. No.: 12611010	WQ Meter Type: ProDSS	NAPL Check: <u>No</u> Bore Diam.: 50 mm
Sampler: <input checked="" type="radio"/> LP <input type="radio"/> NF	Flow Cell: Y Pump Depth: ----	Ref.datum: TOC Bore Depth: <u>3.92</u> m Well Cap Secure? <u>Yes</u>
Date: 27/06/2023	WLevel Meter Type: Dip / Fox ( <input checked="" type="radio"/> Int.Fce) / Gge	PID...N/A
Round: Q2	Field Filtered? <input checked="" type="radio"/> Y / <input type="radio"/> N (filter vessel, <input checked="" type="radio"/> disposable filter/syringe)	

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec. Cond ( <u>Sec</u> )	Dis.Oxygen ( <u>mg/L</u> )	Ox-Red Pt. (± mV)	SWL (m TOC)	Turbidity ( <u>NTU</u> )	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate
Stable when (3 consecutive readings):									
		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
08:30	0.5	16.5	5.95	4070	1.47	-13	1.73	699	No odour, No sheen, Brown - orange, trace sediment and small pieces of grass. Slightly turbid.
08:33	1.0	16.4	5.83	4090	0.42	-24	1.74	320	
08:36	1.5	16.1	5.81	4097	0.24	-26	1.73	236	
08:39	2.0	16.1	5.81	4095	0.17	-27	1.73	172	
08:42	2.5	16.2	5.81	4090	0.15	-27	1.73	162	
08:45	3.0	16.1	5.81	4095	0.16	-28	1.73	159	

Field QA Checks:

Air bubbles in vials? Y  N  Any violent reactions? Y  N

Decontamination as per GHD procedure? Y  N

Was sampling equipment pre-cleaned? Y  N

COC updated? Y  N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.				
Preservatives													

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc +FD01, +FD02

Purge Volumes  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack



# Purging and Sampling Record

Bore ID: MW307R

Job Information	Sampling Information	Bore Information
Client: Aurizon	Purge Method: MP <u>Peri</u>	SWL(mbTOC): <u>0.52</u> m Logic Check: N/A
Project: TSF Hexham Compliance Monitoring	Sample Method: MP <u>Peri</u>	Screen: From: N/A m Stick Up: as prev. round
Proj. No.: 12611010	WQ Meter Type: ProDSS	NAPL Check: <u>N/A</u> Bore Diam.: 50 mm
Sampler: LP / NF	Flow Cell: Y Pump Depth: <u>4</u>	Ref.datum: TOC Bore Depth: <u>5.99</u> m Well Cap Secure? <u>N</u>
Date: 27/06/2023	WLevel Meter Type: Dip / Fox <u>Int.Fce</u> / Gge	PID...N/A
Round: Q2	Field Filtered? <u>Y</u> / <u>N</u> (filter vessel, <u>disposable filter/syringe</u> )	

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (.....)	Dis.Oxygen (.....)	Ox-Red Pt. (± mV)	SWL (m TOC)	<u>NTU</u>	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate
Stable when (3 consecutive readings)									
	-	-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
12:30	0.5	18.4	6.9	33280	0.5	-101.5	3.19	3.42	swl will not stabilise even with pump on lowest setting recharge too slow.
	1.0	18.5	6.9	33008	0.3	-107.4	2.27	5.14	
	1.5	18.2	6.9	32696	0.2	-112.9	2.39	7.7	
	2.0	18.4	6.9	32077	0.1	-117.3	2.53	3.8	
	2.5	18.7	6.9	31809	0.1	-120.5	2.79	5.2	
12:44	3.0	18.6	6.9	31650	0.1	-121.3	2.95	7.4	no sheen, moderate H <sub>2</sub> S odour, clear, slight yellow tinge

Field QA Checks: Air bubbles in vials? <u>Y</u> <u>N</u> Any violent reactions? <u>Y</u> <u>N</u> Decontamination as per GHD procedure? <u>Y</u> <u>N</u> Was sampling equipment pre-cleaned? <u>Y</u> <u>N</u> COC updated? <u>Y</u> <u>N</u>	<table border="1"> <thead> <tr> <th>Parameters</th> <th>BTEX</th> <th>TPH</th> <th>PAH</th> <th>CHC</th> <th>PCB</th> <th>OCP</th> <th>OPP</th> <th>Tot. Metal</th> <th>Biol.</th> </tr> </thead> <tbody> <tr> <td>Preservatives</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.	Preservatives									
Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.												
Preservatives																					

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack



# Purging and Sampling Record

Bore ID: MW308

Job Information	Sampling Information	Bore Information
Client: Aurizon	Purge Method: MP <u>Peri</u>	SWL(mbTOC): <u>0.855</u> m Logic Check: N/A
Project: TSF Hexham Compliance Monitoring	Sample Method: MP <u>Peri</u>	Screen: From: N/A m Stick Up: as prev. round
Proj. No.: 12611010	WQ Meter Type: ProDSS	NAPL Check: <u>N/A</u> Bore Diam.: 50 mm
Sampler: LP / NF	Flow Cell: Y Pump Depth: ----	Ref.datum: TOC Well Cap Secure? <u>No</u>
Date: 27/06/2023	WLevel Meter Type: Dip / Fox (Int.Fce) / Gge	Bore Depth: <u>3.36</u> m PID...N/A
Round: Q2	Field Filtered? <u>Y/N</u> (filter vessel, disposable filter/syringe)	

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (.....)	Dis.Oxygen (.....)	Ox-Red Pt. (± mV)	SWL (m TOC)	(.....)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
9:57	0.5	16.2	<del>6.1</del> 6.1	7024	0.8	-86.3	1.34	1222	
9:59	1.0	16.5	6.1	5577	0.36	-85.3	1.47	1650	
10:00	1.5	14.5	6.1	4350	0.3	-68.6	1.53	1422	
10:01	2.0	13.8	6.1	3954	0.3	-57.9	1.60	905	
10:03	2.5	13.5	6.1	3770	0.3	-44.6	1.62	550	Recharge too slow for peri pump
10:05	3.0	13.4	6.1	3686	0.3	-54.6	1.73	345	STW no fully stable
	<del>3.5</del>								High turbidity, orange/brown, no sheen no odour, orange algae seeds.

<p>Field QA Checks:</p> <p>Air bubbles in vials? <u>Y/N</u> Any violent reactions? <u>Y/N</u></p> <p>Decontamination as per GHD procedure? <u>Y/N</u></p> <p>Was sampling equipment pre-cleaned? <u>Y/N</u></p> <p>COC updated? <u>Y/N</u></p>	<table border="1"> <thead> <tr> <th>Parameters</th> <th>BTEX</th> <th>TPH</th> <th>PAH</th> <th>CHC</th> <th>PCB</th> <th>OCP</th> <th>OPP</th> <th>Tot. Metal</th> <th>Biol.</th> <th></th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>Preservatives</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.					Preservatives													
Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.																				
Preservatives																													

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack



# SURFACE WATER SAMPLING RECORD

PROJECT NO.	12611010	SURFACE WATER ID	Basin 1
PROJECT NAME	Aurizon TSF Hexham Monitoring	DATE	11/07/2023
CLIENT	Aurizon	TIME	12:25
SITE	Aurizon Hexham	LOGGED BY	CP
COORDINATES/GPS (if applicable)	N/A		
SAMPLING METHOD (e.g. grab, bucket)			
DETAILED SAMPLE LOCATION DESCRIPTION			

## ENVIRONMENTAL OBSERVATIONS

WEATHER	Windy, Fine
VEGETATION	Cattails and reeds
SLOPE	-
EROSION	-
OTHER (colour, sheen, odour, turbidity, sediment)	Brown, No odour, No sheen, Duck weed on surface Turbid,

## FIELD MEASUREMENTS

TEMPERATURE (°C)	9.5
pH	7.7
SPC / EC (µS/cm)	1209
DO (ppm) mg/L	0.9
REDOX (mV)	-79
Turbidity (NTU)	2.1

## HYDROLOGICAL DATA

FLOW MEASUREMENT	<1m/min
CROSS SECTION WIDTH (m)	>1m
DEPTH (m)	>1m
OTHER	

SAMPLE NO.	NO. CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
Basin 1	-	-	No sample - parameters only	





# SURFACE WATER SAMPLING RECORD

PROJECT NO.	12611010	SURFACE WATER ID	Basin 2
PROJECT NAME	Aurizon TSF Hexham Monitoring	DATE	11/07/2023
CLIENT	Aurizon	TIME	10:40
SITE	Aurizon Hexham	LOGGED BY	EC
COORDINATES/GPS (if applicable)	N/A		
SAMPLING METHOD (e.g. grab, bucket)			
DETAILED SAMPLE LOCATION DESCRIPTION			

## ENVIRONMENTAL OBSERVATIONS

WEATHER \_\_\_\_\_

VEGETATION \_\_\_\_\_

SLOPE \_\_\_\_\_

EROSION \_\_\_\_\_

OTHER (colour, sheen, odour, turbidity, sediment) \_\_\_\_\_

DRY

## FIELD MEASUREMENTS

TEMPERATURE (°C) \_\_\_\_\_

pH \_\_\_\_\_

SPC / EC (µS/cm) \_\_\_\_\_

DO (ppm) \_\_\_\_\_

REDOX (mV) \_\_\_\_\_

## HYDROLOGICAL DATA

FLOW MEASUREMENT \_\_\_\_\_

CROSS SECTION WIDTH (m) \_\_\_\_\_

DEPTH (m) \_\_\_\_\_

OTHER \_\_\_\_\_

SAMPLE NO.	NO. CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

FIELD SUPERVISOR \_\_\_\_\_ CHECKED (SIGN & DATE) \_\_\_\_\_ / / 2023



**SURFACE WATER  
SAMPLING RECORD**

PROJECT NO.	12611010	SURFACE WATER ID	Basin 3
PROJECT NAME	Aurizon TSF Hexham Monitoring	DATE	11/07/2023
CLIENT	Aurizon	TIME	11:30
SITE	Aurizon Hexham	LOGGED BY	LP
COORDINATES/GPS (if applicable)	N/A		
SAMPLING METHOD (e.g. grab, bucket)			
DETAILED SAMPLE LOCATION DESCRIPTION			

**ENVIRONMENTAL OBSERVATIONS**

WEATHER	Windy, Fine
VEGETATION	Reeds in river, overgrown grass along banks
SLOPE	-
EROSION	-
OTHER (colour, sheen, odour, turbidity, sediment)	Brown, Bacterial (thick), algae, Duck weed, turbid No odour

**FIELD MEASUREMENTS**

TEMPERATURE (°C)	8.6
pH	7.5
SPC / EC (µS/cm)	1670
DO (ppm) % sat	1.13
REDOX (mV)	-162
Turbidity (NTU)	18

**HYDROLOGICAL DATA**

FLOW MEASUREMENT	clm per min
CROSS SECTION WIDTH (m)	>1m
DEPTH (m)	clm
OTHER	

SAMPLE NO.	NO. CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
Basin 3	-	-	-	No sample - only Parameters



# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID: Basin 1

PROJECT NO. 12611010 DATE: 15/8/2023

PROJECT NAME: Aurizon TSF Hexham Monitoring TIME:

CLIENT: Aurizon SAMPLING OFFICER: W. H. E.C.

COORDINATES/GPS (if Applicable)

SAMPLING METHOD (ie grab, bucket) Grab

DETAILED SAMPLE LOCATION DESCRIPTION Basin 1

### ENVIRONMENTAL OBSERVATIONS

WEATHER Fine / sunny

VEGETATION Grasses / fine weed / razor grass / Typha / small amount of duck weed

SLOPE

EROSION none visible

OTHER

### FIELD MEASUREMENTS

TEMPERATURE (°C): 13.4 CONDUCTIVITY (uS/cm): 1023

pH: 7.25 DO (mg/L): 3.53

REDOX (mV): -86.8 Turbidity (NTU): 6.27

Sheen, Colour, Odour. Bact. sheen visible / brown colour / no odour

Sediment Description

### HYDROLOGICAL DATA

FLOW MEASUREMENT (or stream height if rating table available) still

CROSS SECTION WIDTH (m) 4m

DEPTH (m) 0.3

OTHER

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS



# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID: Basin 2

PROJECT NO. 12611010 DATE: 15/8/2023  
 PROJECT NAME: Aurizon TSF Hexham Monitoring TIME:  
 CLIENT: Aurizon SAMPLING OFFICER: LW HAB E.C

COORDINATES/GPS (if Applicable)

SAMPLING METHOD (ie grab, bucket) Grab

DETAILED SAMPLE LOCATION DESCRIPTION Basin 2

### ENVIRONMENTAL OBSERVATIONS

WEATHER Fine - sunny  
 VEGETATION slashed path / grasses / typha  
 SLOPE  
 EROSION  
 OTHER

### FIELD MEASUREMENTS

TEMPERATURE (°C): \_\_\_\_\_ CONDUCTIVITY (uS/cm): \_\_\_\_\_  
 pH: \_\_\_\_\_ DO (mg/L) \_\_\_\_\_  
 REDOX (mV): \_\_\_\_\_ Turbidity (NTU) \_\_\_\_\_  
 Sheen, Colour, Odour, \_\_\_\_\_  
 Sediment Description DCy

### HYDROLOGICAL DATA

FLOW MEASUREMENT  
 (or stream height if rating table available) \_\_\_\_\_  
 CROSS SECTION WIDTH (m) \_\_\_\_\_  
 DEPTH (m) \_\_\_\_\_  
 OTHER \_\_\_\_\_

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS



# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID: Basin 3

PROJECT NO. ~~12611010~~ 12611010 DATE: 15/8/2023  
PROJECT NAME: Aurizon TSF Hexham Monitoring TIME:  
CLIENT: Aurizon SAMPLING OFFICER: ~~IAE~~ E.C

COORDINATES/GPS (if Applicable)  
SAMPLING METHOD (ie grab, bucket) Grab  
DETAILED SAMPLE LOCATION DESCRIPTION

## ENVIRONMENTAL OBSERVATIONS

WEATHER Fine - sunny  
VEGETATION Grasses (over-grown on track) Typha / duck weed  
SLOPE  
EROSION none visible  
OTHER

## FIELD MEASUREMENTS

TEMPERATURE (°C): 11.7 CONDUCTIVITY (uS/cm): 1275  
pH: 7.19 DO (mg/L): 2.75  
REDOX (mV): -169.7 Turbidity (NTU): 5.50  
Sheen, Colour, Odour, no sheen / no odour / difficult to see colour for Typha.  
Sediment Description

## HYDROLOGICAL DATA

FLOW MEASUREMENT (or stream height if rating table available) still  
CROSS SECTION WIDTH (m) Typha width - 3.5m  
DEPTH (m) 0.3  
OTHER Rabbit holes + rabbits spotted at basin 3

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS



# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID: Basin 1

PROJECT NO. ~~12611010~~ 12611010      DATE: ~~22/09/2023~~ 26/09/2023  
 PROJECT NAME: Aurizon TSF Hexham Monitoring      TIME: 08:20  
 CLIENT: Aurizon      SAMPLING OFFICER: EC

COORDINATES/GPS (if Applicable) \_\_\_\_\_  
 SAMPLING METHOD (ie grab, bucket) Grab  
 DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

ENVIRONMENTAL OBSERVATIONS  
 WEATHER Fine - Hot.  
 VEGETATION Rozor grass / Typha / duck-weed.  
 SLOPE \_\_\_\_\_  
 EROSION \_\_\_\_\_  
 OTHER \_\_\_\_\_

FIELD MEASUREMENTS  
 TEMPERATURE (°C): 14.7      CONDUCTIVITY (uS/cm): 1356  
 pH: 7.58      DO (mg/L): 3.8  
 REDOX (mV): -114.8      Turbidity (NTU): 6.80  
 Sheen, Colour, Odour, slightly turbid / brown colour / least sheen  
 Sediment Description no odour.

HYDROLOGICAL DATA  
 FLOW MEASUREMENT (or stream height if rating table available) ~~###~~ still  
 CROSS SECTION WIDTH (m) \_\_\_\_\_  
 DEPTH (m) \_\_\_\_\_  
 OTHER \_\_\_\_\_

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
<u>Basin 1</u>	<u>8</u>		<u>—</u>	



# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID Basin 2

PROJECT NO. ~~12501700~~ 12610110      DATE: ~~22/09/2023~~ 26/09/2023  
 PROJECT NAME: Aurizon TSF Hexham Monitoring      TIME: 08:04  
 CLIENT: Aurizon      SAMPLING OFFICER: EC

COORDINATES/GPS (if Applicable) \_\_\_\_\_  
 SAMPLING METHOD (ie grab, bucket) Grab  
 DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

### ENVIRONMENTAL OBSERVATIONS

WEATHER Fine - Hot  
 VEGETATION Typha / grasses  
 SLOPE \_\_\_\_\_  
 EROSION \_\_\_\_\_  
 OTHER \_\_\_\_\_

### FIELD MEASUREMENTS

TEMPERATURE (°C): \_\_\_\_\_ CONDUCTIVITY (uS/cm): \_\_\_\_\_  
 pH: \_\_\_\_\_ DO (mg/L): \_\_\_\_\_  
 REDOX (mV): \_\_\_\_\_ Turbidity (NTU): \_\_\_\_\_  
 Sheen, Colour, Odour, \_\_\_\_\_  
 Sediment Description Dry

### HYDROLOGICAL DATA

FLOW MEASUREMENT  
 (or stream height if rating table available) \_\_\_\_\_  
 CROSS SECTION WIDTH (m) \_\_\_\_\_  
 DEPTH (m) \_\_\_\_\_  
 OTHER \_\_\_\_\_

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
<u>Dry</u>				

MWD18



# SURFACE WATER SAMPLING RECORD

PROJECT NO. 12611010 SURFACE WATER ID Basin 3  
 PROJECT NAME Aurizon TSF Hexham Monitoring DATE 26/09/2023  
 CLIENT Aurizon TIME 10:30  
 SITE Aurizon Hexham LOGGED BY NF  
 COORDINATES/GPS (if applicable) N/A  
 SAMPLING METHOD (e.g. grab, bucket) grab  
 DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

## ENVIRONMENTAL OBSERVATIONS

WEATHER \_\_\_\_\_  
 VEGETATION fine reeds  
 SLOPE \_\_\_\_\_  
 EROSION gentle  
 OTHER (colour, sheen, odour, turbidity, sediment) \_\_\_\_\_

## FIELD MEASUREMENTS

TEMPERATURE (°C) \_\_\_\_\_  
 pH \_\_\_\_\_  
 SPC / EC (µS/cm) \_\_\_\_\_  
 DO (ppm) \_\_\_\_\_  
 REDOX (mV) \_\_\_\_\_

*no sample*

## HYDROLOGICAL DATA

FLOW MEASUREMENT \_\_\_\_\_  
 CROSS SECTION WIDTH (m) \_\_\_\_\_  
 DEPTH (m) \_\_\_\_\_  
 OTHER \_\_\_\_\_

SAMPLE NO	NO. CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
<u>Basin 3</u>		<u>ice</u>		
<u>Basin 3</u>		<u>ice</u>		

FIELD SUPERVISOR \_\_\_\_\_ CHECKED (SIGN & DATE) \_\_\_\_\_ / / 2023





# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID: SW1

PROJECT NO. 12584780 DATE: ~~22/03/2023~~ 26/9/23  
 PROJECT NAME: Aurizon TSF Hexham Monitoring TIME: 12:25  
 CLIENT: Aurizon SAMPLING OFFICER: EC

COORDINATES/GPS (If Applicable)

SAMPLING METHOD (ie grab, bucket) Grab

DETAILED SAMPLE LOCATION DESCRIPTION No sample taken as not flowing

### ENVIRONMENTAL OBSERVATIONS

WEATHER Fine / Hot

VEGETATION

SLOPE

EROSION

OTHER

### FIELD MEASUREMENTS

TEMPERATURE (°C): \_\_\_\_\_ CONDUCTIVITY (µS/cm): \_\_\_\_\_

pH: \_\_\_\_\_ DO (mg/L) \_\_\_\_\_

REDOX (mV): \_\_\_\_\_ Turbidity (NTU) \_\_\_\_\_

Sheen, Colour, Odour, \_\_\_\_\_

Sediment Description \_\_\_\_\_

*Not taken  
as very  
stagnant  
sheen visible no odour*

### HYDROLOGICAL DATA

FLOW MEASUREMENT (or stream height if rating table available) \_\_\_\_\_

CROSS SECTION WIDTH (m) \_\_\_\_\_

DEPTH (m) \_\_\_\_\_

OTHER \_\_\_\_\_

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
<i>Not taken as not running.</i>				



# Purging and Sampling Record

Bore ID: M1002

### Job Information

Client: Aurizon  
 Project: TSF Hexham Compliance Monitoring  
 Proj. No.: 12611010  
 Sampler: LP / NP  
 Date: 26/09/2023  
 Round: Q3

### Sampling Information

Purge Method: MP Peri  
 Sample Method: MP Peri  
 WQ Meter Type: ProDSS  
 Flow Cell: Y Pump Depth: -----  
 WLevel Meter Type: Dip / Fox / Int.Fce / Gge  
 Field Filtered? Y/N (filter vessel, disposable filter/syringe)

### Bore Information

SWL(mbTOC): 1.88 m Logic Check: N/A  
 Screen: From: N/A m Stick Up: as prev. round  
 NAPL Check: ----- Bore Diam.: 50 mm  
 Ref.datum: TOC 2.66 Well Cap Secure? Y  
 Bore Depth: ----- m PID...N/A

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (.....)	Dis.Oxygen (.....)	Ox-Red Pt. (± mV)	SWL (m TOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate	
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
10:51	0.5	19.1	5.5	2116	0.3	36.1	1.90	190.9	slight turbid, no o/s, some ants, light brown
10:55	1.0	19.0	5.5	2064	0.3	36.9	1.90	57.0	
10:57	1.5	18.9	5.4	2024	0.2	38.8	1.90	42.3	
10:59	2.0	18.9	5.4	2022	0.2	39.4	1.90	29.3	

**QA Checks:**  
 Air bubbles in vials? Y/N Any violent reactions? Y/N  
 Decontamination as per GHD procedure? Y/N  
 Was sampling equipment pre-cleaned? Y/N  
 COC updated? Y/N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.				
Preservatives													

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

**Purge Volumes**  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack

ed t c



# Purging and Sampling Record

Bore ID: 101R

<b>Job Information</b> Client: Aurizon Project: TSF Hexham Compliance Monitoring Proj. No.: 12611010 Sampler: <u>LP/NF/EC</u> Date: 26/09/2023 Round: Q3		<b>Sampling Information</b> Purge Method: MP <u>Peri</u> Sample Method: MP <u>Peri</u> WQ Meter Type: ProDSS Flow Cell: Y Pump Depth: _____ WLevel Meter Type: Dip / Fox / <u>ED</u> / Goe Field Filtered? <u>Y/N</u> (filter vessel, <u>disposable filter/syringe</u> )		<b>Bore Information</b> SWL(mbTOC): <u>2.08m</u> m Logic Check: N/A Screen: From: N/A m Stick Up: as prev. round NAPL Check: _____ Bore Diam.: 50 mm Ref.datum: TOC Well Cap Secure? _____ Bore Depth: <u>5.41m</u> m PID...N/A	
--	--	---	--	--	--

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec. Cond (.....)	Dis. Oxygen (.....)	Ox-Red Pt. (± mV)	SWL (m TOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable	
09:05	0.5	19.5	6.43	8884	5.8	-98.0	2.33	Slightly turbid / orange-brown colour
09:10	1.0	19.9	6.45	9011	5.3	-87.5	2.34	
09:16	1.5	20.1	6.45	9066	4.4	-80.5	2.34	no odour / no sheen.
09:22	2.0	19.8	6.46	9082	3.1	-77.6	2.37	
09:27	2.5	19.8	6.46	9081	2.4	-76.5	2.41	
	<u>BLO</u>							Sample taken at 2.5L
								as SWL continues to drop, and time constraints

**Field QA Checks:**

Air bubbles in vials? Y N Any violent reactions? Y N

Decontamination as per GHD procedure? Y N

Was sampling equipment pre-cleaned? Y N

COC updated? Y N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.				
Preservatives													

**Comment:** Duplicate samples collected, bottles used, access, condition of headworks etc

**Purge Volumes**  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack

Scanned with CamScanner



# Purging and Sampling Record

Bore ID: MWOIR

Job Information

Client: Aurizon  
 Project: TSF Hexham Compliance Monitoring  
 Proj. No.: 12611010  
 Sampler: LP (NF)  
 Date: 26/09/2023  
 Round: Q3

Sampling Information

Purge Method: MP (Peri)  
 Sample Method: MP (Peri)  
 WQ Meter Type: ProDSS  
 Flow Cell: Y Pump Depth: ---  
 WLevel Meter Type: Dip / Fox / Int. Fce / Gge  
 Field Filtered? Y/N (filter vessel, disposable filter/syringe)

Bore Information

SWL(mbTOC): 259 m Logic Check: N/A  
 Screen: From: N/A m Stick Up: as prev. round  
 NAPL Check: ..... Bore Diam.: 50 mm  
 Ref.datum: TOC 538 Well Cap Secure? Y  
 Bore Depth: ..... m PID...N/A

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec. Cond (.....)	Dis. Oxygen (.....)	Ox-Red Pt. (± mV)	SWL (m TOC)	<u>(NTU)</u>	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
11:39	0.5	18.2	6.4	14050	0.8	-80.5	1.72	72.5	recharge too slow for peri pump speed
	1.0	19.2	6.5	11240	0.4	-99	1.86	52.3	
11:43	1.5	18.5	6.4	8931	0.4	-92.9	1.95	51.8	
11:45	2.0	18.6	6.3	8390	0.3	-81.0	1.97	95.9	
11:49	2.5	18.6	6.3	7990	0.3	-65.3	2.08	63.8	
11:	3.0	19.9	6.1	7615	0.2	-56.7	2.11	46.3	slight turbid, brown, no o/s trace brown algae floc

Field QA Checks:

Air bubbles in vials? Y/N Any violent reactions? Y/N  
 Decontamination as per GHD procedure? Y/N  
 Was sampling equipment pre-cleaned? Y/N  
 COC updated? Y/N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.
Preservatives									

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

2x additional samples as requested  
MWOIR\_2

FD01 + FD02

Purge Volumes  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack



# Purging and Sampling Record

Bore ID: M M M 01 R

Job Information	Sampling Information	Bore Information
Client: Aurizon Project: TSF Hexham Compliance Monitoring Proj. No.: 12611010 Sampler: LP <u>NF</u> Date: 26/09/2023 Round: Q3	Purge Method: MP <u>Peri</u> Sample Method: MP <u>Peri</u> WQ Meter Type: ProDSS Flow Cell: Y Pump Depth: ---- WLevel Meter Type: Dip / Fox / Irq.Fce / Gpe Field Filtered? <u>Y</u> / N (filter vessel, <u>disposable filter</u> /syringe)	SWL(mbTOC): ..... <u>1.26</u> ..... m Logic Check: N/A Screen: From: N/A m Stick Up: as prev. round NAPL Check:..... Bore Diam.: 50 mm Ref.datum: TOC Bore Depth: ..... <u>3.04</u> ..... m PID...N/A Well Cap Secure?.....

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (.....)	Dis.Oxygen (.....)	Ox-Red Pt. (± mV)	SWL (m TOC)	<u>NTU</u>	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
<del>8:18</del>	0.5	16.5	6.3	24351	1.3	-86.2	1.46	239.6	Turbid, grey brown, no o/s
8:21	1.0	16.4	6.3	24570	1.1	-90.9	1.46	281.3	
8:22	1.5	16.3	6.3	24494	1.1	-86.3	//	199.3	
8:24	2.0	16.3	6.3	24508	1.1	-83	1.46	172.0	

Field QA Checks: Air bubbles in vials? Y <u>N</u> Any violent reactions? Y <u>N</u> Decontamination as per GHD procedure? Y <u>N</u> Was sampling equipment pre-cleaned? Y <u>N</u> COC updated? Y <u>N</u>	<table border="1"> <thead> <tr> <th>Parameters</th> <th>BTEX</th> <th>TPH</th> <th>PAH</th> <th>CHC</th> <th>PCB</th> <th>OCP</th> <th>OPP</th> <th>Tot. Metal</th> <th>Biol.</th> <th></th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>Preservatives</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.					Preservatives													
Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.																				
Preservatives																													

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack

Scanned with CamScanner



# Purging and Sampling Record

Bore ID: MW106R

### Job Information

Client: Aurizon  
 Project: TSF Hexham Compliance Monitoring  
 Proj. No.: 12611010  
 Sampler: LP/NE EC  
 Date: 26/09/2023  
 Round: Q3

### Sampling Information

Purge Method: MP Peri  
 Sample Method: MP Peri  
 WQ Meter Type: ProDSS  
 Flow Cell: Y Pump Depth: ----  
 WLevel Meter Type: Dip / Fox / Int. Fce / Gge  
 Field Filtered? Y / N (filter vessel, disposable filter/syringe)

### Bore Information

SWL(mbTOC): 1.63 m Logic Check: N/A  
 Screen: From: N/A m Stick Up: as prev. round  
 NAPL Check: ..... Bore Diam.: 50 mm  
 Ref.datum: TOC Well Cap Secure?.....  
 Bore Depth: 3.32 m PID...N/A

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec. Cond (.....)	Dis. Oxygen (.....)	Ox-Red Pt. (± mV)	SWL (m TOC)	<u>NTU</u> (.....)	Comment:
Stable when (3 consecutive readings):			-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable	
10:50	0.5	18.8	6.96	710	60.1	-22.0	1.70m	33.7	
10:54	1.0	18.0	6.96	674	48.0	4.5	1.72	20.06	clear / no odour /
10:58	1.5	18.2	6.94	652	62.1	16.1	1.72	14.03	
11:02	2.0	18.3	6.93	661	70.7	17.3	1.72	13.79	no colour / no sheen
11:07	2.5	18.3	6.93	664	70.6	15.2	1.72	15.55	no odour.
			Sample taken.						
									UB: strong naphthalene odour in area, but no odour in sample.

### Field QA Checks:

Air bubbles in vials? Y N Any violent reactions? Y N  
 Decontamination as per GHD procedure? Y / N  
 Was sampling equipment pre-cleaned? Y / N  
 COC updated? Y / N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.
Preservations									

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack



# Purging and Sampling Record

Bore ID: MW108R

Job Information	Sampling Information	Bore Information
Client: Aurizon Project: TSF Hexham Compliance Monitoring Proj. No.: 12611010 Sampler: LP / NF Date: 26/09/2023 Round: Q3	Purge Method: MP <u>Peri</u> Sample Method: MP <u>Peri</u> WQ Meter Type: ProDSS Flow Cell: Y Pump Depth: --- WLevel Meter Type: Dip / Fox / Int.Fce / Gge Field Filtered? <u>Y/N</u> (filter vessel, disposable filter/syringe)	SWL(mbTOC): <u>2.36</u> m Logic Check: N/A Screen: From: N/A m Stick Up: as prev. round NAPL Check: ..... Bore Diam.: 50 mm Ref.datum: TOC Bore Depth: <u>4.03</u> m Well Cap Secure? <u>Y</u> PID...N/A

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (.....)	Dis.Oxygen (.....)	Ox-Red Pt. (± mV)	SWL (m TOC)	(.....)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate
Stable when (3 consecutive readings):	-	-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
	0.5	17.3	6.6	3815	0.8	69.2	2.38	175.07	Slightly turbid, no O/S
	1.0	17.2	6.5	3798	0.6	71.7	2.38	111.7	brown/orange brown
	1.5	17.0	6.5	3779	0.5	89.4	//	86.6	
	2.0	17.0	6.5	3762	0.5	44.4	//	29.9	
	2.5	17.0	6.5	3744	0.5	36.8	//	29.8	

<p>Field QA Checks:</p> <p>Air bubbles in vials? Y <u>N</u> Any violent reactions? Y <u>N</u></p> <p>Decontamination as per GHD procedures? Y <u>N</u></p> <p>Was sampling equipment pre-cleaned? Y <u>N</u></p> <p>COC updated? Y <u>N</u></p>	<table border="1"> <thead> <tr> <th>Parameters</th> <th>BTEX</th> <th>TPH</th> <th>PAH</th> <th>CHC</th> <th>PCB</th> <th>OCP</th> <th>OPP</th> <th>Tot. Metal</th> <th>Biol.</th> </tr> </thead> <tbody> <tr> <td>Preservatives</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.	Preservatives									
Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.												
Preservatives																					

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes  
Casing Int. Dia (mm) 50 100 150  
Vol (L/m of casing) 2.0 7.9 17.7  
\*Double for gravel pack



# Purging and Sampling Record

Bore ID: MW109

Job Information		Sampling Information			Bore Information		
Client: Aurizon	Purge Method: MP <u>Peri</u>	SWL(mbTOC): <u>2.30</u>	m	Logic Check: N/A			
Project: TSF Hexham Compliance Monitoring	Sample Method: MP <u>Peri</u>	Screen: From: N/A	m	Stick Up: as prev. round			
Proj. No.: 12611010	WQ Meter Type: ProDSS	NAPL Check: .....		Bore Diam.: 50 mm			
Sampler: <del>LPTNF</del> <u>EC</u>	Flow Cell: Y	Ref.datum: TOC		Well Cap Secure? .....			
Date: 26/09/2023	Pump Depth: ----	Bore Depth: <u>3.15</u>	m	PID...N/A			
Round: Q3	WLevel Meter Type: Dip / Fox / Ins.Fce / Gps						
Field Filtered? <u>Y/N</u> (filter vessel, <u>disposable filter/syringe</u> )							

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (.....)	Dis.Oxygen (.....)	Ox-Red Pt. (± mV)	SWL (m TOC)	<u>NTU</u>	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
12:59	0.5	19.4	7.01	5204	23.9	-114.4	2.50	16.94	slight orange colour
13:	1.0								
13:	1.5								Then ran dry on lowest peri speed setting.
13:	2.0								
<u>Unable to sample</u>									

Field QA Checks:

Air bubbles in vials? Y/N Any violent reactions? Y/N

Decontamination as per GHD procedure? Y/N

Was sampling equipment pre-cleaned? Y/N

COC updated? Y/N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot.Metal	Biol.				
Preservatives													

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes

Casing Int. Dia (mm)	50	100	150
Vol (L/m of casing)	2.0	7.9	17.7

\*Double for gravel pack

Scanned with CamScanner





# Purging and Sampling Record

Bore ID: MW301R

### Job Information

Client: **Aurizon**  
 Project: **TSF Hexham Compliance Monitoring**  
 Proj. No.: **12611010**  
 Sampler: LP/NS **EG**  
 Date: **26/09/2023**  
 Round: **Q3**

### Sampling Information

Purge Method: **MP** **Peri**  
 Sample Method: **MP** **Peri**  
 WQ Meter Type: **ProDSS**  
 Flow Cell: **Y** Pump Depth: **-----**  
 WLevel Meter Type: **Dip / Fox / Int. Fce / Gps**  
 Field Filtered? **Y/N** (filter vessel, disposable filter/syringe)

### Bore Information

SWL(mbTOC): ~~N/A~~ **0.78** m Logic Check: **N/A**  
 Screen: From: **N/A** m Stick Up: **as prev. round**  
 NAPL Check: **-----** Bore Diam.: **50 mm**  
 Ref.datum: **TOC** Well Cap Secure? **-----**  
 Bore Depth: **4.87** m PID: **N/A**

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec. Cond (.....)	Dis. Oxygen (.....)	Ox-Red Pt. (± mV)	SWL (m TOC)	NTU (.....)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate
Stable when (3 consecutive readings):			-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable	
11:37	0.5	17.5	6.59	17095	6.1	-78.1	1.04	16.13	
11:42	1.0	18.2	6.67	17793	3.6	-91.2	1.08	55.29	Orange sediments.
11:46	1.5	18.2	6.69	17578	3.2	-94.0	1.10	62.57	
11:50	2.0	18.2	6.70	17514	2.7	-96.0	1.10	70.63	slightly turbid
11:55	2.5	18.1	6.71	17503	2.3	-97.1	1.11	40.12	
12:01	3.0	18.1	6.71	17474	2.0	-97.5	1.12	38.80	Orange colour
									no odour
									no sheen
Sample taken									

Field QA Checks:  
 Air bubbles in vials? **Y** Any violent reactions? **Y**  
 Decontamination as per GHD procedure? **Y**  
 Was sampling equipment pre-cleaned? **Y**  
 COC updated? **Y**

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.
Preservatives									

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack

Scanned with CamScanner



# Purging and Sampling Record

Bore ID: MW302R

<b>Job Information</b>		<b>Sampling Information</b>			<b>Bore Information</b>		
Client: Aurizon		Purge Method: MP	Peri	SWL(mbTOC): 1.72	m	Logic Check: N/A	
Project: TSF Hexham Compliance Monitoring		Sample Method: MP	Peri	Screen: From: N/A	m	Stick Up: as prev. round	
Proj. No.: 12611010		WQ Meter Type: ProDSS		NAPL Check: .....		Bore Diam.: 50 mm	
Sampler: <del>UPNF</del> EC		Flow Cell: Y	Pump Depth: ----	Ref.datum: TOC		Well Cap Secure?.....	
Date: 26/09/2023		WLevel Meter Type: Dip / Fox / Int. Fce / Gde		Bore Depth: 3.92	m	PID...N/A	
Round: Q3		Field Filtered? <input checked="" type="checkbox"/> Y / <input type="checkbox"/> N (filter vessel, <input checked="" type="checkbox"/> disposable filter/syringe)					

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec. Cond (.....)	Dis. Oxygen (.....)	Ox-Red Pt. (± mV)	SWL (m TOC)	.....	Comment:
Stable when (3 consecutive readings):			-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable	
10:00	0.5	17.9	5.93	4464	4.6	-29.7	1.80	211.06	Very turbid / orange
10:04	1.0	17.8	5.93	4353	2.8	-31.6	1.80	169.35	
10:07	1.5	17.7	5.92	4265	2.0	-32.7	1.80	129.40	colour / no odour /
10:11	2.0	17.6	5.92	4206	1.6	-33.5	1.80	103.83	
10:15	2.5	17.6	5.92	4166	1.4	-34.1	1.80	74.90	no sheen.
Sample taken									

**Field QA Checks:**

Air bubbles in vials? Y /  N

Any violent reactions? Y /  N

Decontamination as per GHD procedure? Y /  N

Was sampling equipment pre-cleaned? Y /  N

COC updated? Y /  N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.				
Preservatives													

**Comment:** Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack

Scanned with CamScanner



# Purging and Sampling Record

Bore ID: MW307R

<b>Job Information</b>		<b>Sampling Information</b>			<b>Bore Information</b>		
Client: Aurizon		Purge Method: MP <u>Peri</u>	SWL(mbTOC): <u>1.63</u> m		Logic Check: N/A		
Project: TSF Hexham Compliance Monitoring		Sample Method: MP <u>Peri</u>	Screen: From: N/A m		Stick Up: as prev. round		
Proj. No.: 12611010		WQ Meter Type: ProDSS	NAPL Check: -----		Bore Diam.: 50 mm		
Sampler: LP <u>NF</u>		Flow Cell: Y	Pump Depth: -----		Well Cap Secure? <u>Y</u>		
Date: 26/09/2023		WLevel Meter Type: Dip / Fox / Int. Fce / Gde	Ref.datum: TOC		PID...N/A		
Round: Q3		Field Filtered? <u>Y</u> / <u>N</u> (filter vessel, <u>disposable filter/syringe</u> )					

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec. Cond (.....)	Dis. Oxygen (.....)	Ox-Red Pt. (± mV)	SWL (m TOC)	<u>NTU</u> (.....)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
952	0.5	19.0	7.2	35236	0.8	-99.6	1.98	4.3	SWL dropping too fast for lowest setting of peri
956	1.0	19.8	7.2	34990	0.1	-106.0	2.24	3.6	
1000	1.5	19.7	7.3	34761	0.1	-114.1	2.42	4.2	
1003	2.0	19.9	7.3	34322	0	-116	2.62	4.8	
									- clear <del>colourless</del> yellow tinge, moderate H <sub>2</sub> S odour, no sheen

<b>Field QA Checks:</b>		<b>Parameters</b>												
Air bubbles in vials? <u>Y</u> / <u>N</u>	Any violent reactions? <u>Y</u> / <u>N</u>	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.				
Decontamination as per GHD procedure? <u>Y</u> / <u>N</u>	Was sampling equipment pre-cleaned? <u>Y</u> / <u>N</u>	Preservatives												
COC updated? <u>Y</u> / <u>N</u>														

**Comment:** Duplicate samples collected, bottles used, access, condition of headworks etc

**Purge Volumes**  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack



# Purging and Sampling Record

Bore ID: MW308R

Job Information	Sampling Information	Bore Information
Client: Aurizon	Purge Method: MP <u>Peri</u>	SWL(mbTOC): <u>0.95</u> m
Project: TSF Hexham Compliance Monitoring	Sample Method: MP <u>Peri</u>	Screen: From: N/A m
Proj. No.: 12611010	WQ Meter Type: ProDSS	NAPL Check:.....
Sampler: LP <u>NF</u>	Flow Cell: Y	Ref.datum: TOC <u>382</u>
Date: 26/09/2023	Pump Depth: ----	Bore Depth: <u>382</u> m
Round: Q3	WLevel Meter Type: Dip / Fox / Int.Fce / Gge	Logic Check: N/A
	Field Filtered? <u>Y/N</u> (filter vessel, disposable filter/syringe)	Stick Up: as prev. round
		Bore Diam.: 50 mm
		Well Cap Secure? <u>Y</u>
		PID...N/A

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (.....)	Dis.Oxygen (.....)	Ox-Red Pt. (± mV)	SWL (m TOC)	(.....)	Comment:
Stable when (3 consecutive readings):									
		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
9:18	0.5	17.0	6.4	3928	0.7	-56.4	1.27	375.2	
	1.0	17.6	6.4	3444	0.4	-110.1	1.38	193.6	-SWL will not stabilise
9:24	1.5	18.5	6.3	3189	0.5	-43.6	1.45	79.3	too slow for lower peri
9:24	2.0	18.6	6.3	3150	0.4	-51.1	1.50	71.3	Setting
									- slight turbid, orange/brown
									NO S/O, orange algae flecks

<b>Field QA Checks:</b> Air bubbles in vials? Y <u>N</u> Any violent reactions? Y <u>N</u> Decontamination as per GHD procedure? <u>Y</u> / N Was sampling equipment pre-cleaned? <u>Y</u> / N COC updated? <u>Y</u> / N	<table border="1"> <thead> <tr> <th>Parameters</th> <th>BTEX</th> <th>TPH</th> <th>PAH</th> <th>CHC</th> <th>PCB</th> <th>OCP</th> <th>OPP</th> <th>Tot. Metal</th> <th>Biol.</th> </tr> </thead> <tbody> <tr> <td>Preservatives</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.	Preservatives									
Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.												
Preservatives																					

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack



SURFACE WATER SAMPLING RECORD

PROJECT NO. 12611010 SURFACE WATER ID Basin 1  
 PROJECT NAME Aurizon DATE 19/10/23  
 CLIENT \_\_\_\_\_ TIME 10:40am  
 SITE Hexham LOGGED BY NF  
 COORDINATES/GPS (if applicable) N/A  
 SAMPLING METHOD (e.g. grab, bucket) \_\_\_\_\_  
 DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

ENVIRONMENTAL OBSERVATIONS

WEATHER overcast  
 VEGETATION Typhae, reeds, grass  
 SLOPE gentle  
 EROSION \_\_\_\_\_  
 OTHER (colour, sheen, odour, turbidity, sediment) \_\_\_\_\_

FIELD MEASUREMENTS

TEMPERATURE (°C) \_\_\_\_\_  
 pH \_\_\_\_\_  
 SPC / EC (µS/cm) \_\_\_\_\_  
 DO (mg/L) \_\_\_\_\_  
 DO (%) \_\_\_\_\_  
 REDOX (mV) \_\_\_\_\_

*Snake spotted left area called Leslie*

HYDROLOGICAL DATA

FLOW MEASUREMENT \_\_\_\_\_  
 CROSS SECTION WIDTH (m) \_\_\_\_\_  
 DEPTH (m) \_\_\_\_\_  
 OTHER \_\_\_\_\_

SAMPLE NO.	NO. CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS

FIELD SUPERVISOR

CHECKED (SIGN & DATE)



# SURFACE WATER SAMPLING RECORD

PROJECT NO. 12611010 SURFACE WATER ID Basin 2  
PROJECT NAME \_\_\_\_\_ DATE 19/10/23  
CLIENT Aurizon TIME 10:30  
SITE Hexham LOGGED BY NF  
COORDINATES/GPS (if applicable) N/A  
SAMPLING METHOD (e.g. grab, bucket) \_\_\_\_\_  
DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

## ENVIRONMENTAL OBSERVATIONS

WEATHER overcast  
VEGETATION reeds, Typhae  
SLOPE gentle  
EROSION \_\_\_\_\_  
OTHER (colour, sheen, odour, turbidity, sediment) Dry

## FIELD MEASUREMENTS

TEMPERATURE (°C) \_\_\_\_\_  
pH \_\_\_\_\_  
SPC / EC (µS/cm) \_\_\_\_\_  
DO (mg/L) \_\_\_\_\_  
DO (%) \_\_\_\_\_  
REDOX (mV) \_\_\_\_\_  
Dry

## HYDROLOGICAL DATA

FLOW MEASUREMENT \_\_\_\_\_  
CROSS SECTION WIDTH (m) \_\_\_\_\_  
DEPTH (m) \_\_\_\_\_  
OTHER \_\_\_\_\_

SAMPLE NO.	NO. CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

FIELD SUPERVISOR

CHECKED (SIGN & DATE)



**SURFACE WATER  
SAMPLING RECORD**

PROJECT NO. 1261100 SURFACE WATER ID Basin 3  
 PROJECT NAME Aurizon DATE 19/10/23  
 CLIENT \_\_\_\_\_ TIME 11:15am  
 SITE Hexham LOGGED BY NF  
 COORDINATES/GPS (if applicable) \_\_\_\_\_ N/A  
 SAMPLING METHOD (e.g. grab, bucket) \_\_\_\_\_  
 DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

**ENVIRONMENTAL OBSERVATIONS**

WEATHER Overcast  
 VEGETATION reeds, grass  
 SLOPE gentle  
 EROSION \_\_\_\_\_  
 OTHER (colour, sheen, odour, turbidity, sediment) Dry

**FIELD MEASUREMENTS**

TEMPERATURE (°C) \_\_\_\_\_  
 pH \_\_\_\_\_  
 SPC / EC (µS/cm) \_\_\_\_\_  
 DO (mg/L) \_\_\_\_\_  
 DO (%) \_\_\_\_\_  
 REDOX (mV) \_\_\_\_\_

*(Note: The entire field measurements section is crossed out with a diagonal line.)*

**HYDROLOGICAL DATA**

FLOW MEASUREMENT \_\_\_\_\_  
 CROSS SECTION WIDTH (m) \_\_\_\_\_  
 DEPTH (m) \_\_\_\_\_  
 OTHER \_\_\_\_\_

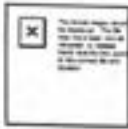
*(Note: The entire hydrological data section is crossed out with a diagonal line.)*

SAMPLE NO.	NO. CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS

*(Note: The entire table is crossed out with a diagonal line.)*

FIELD SUPERVISOR \_\_\_\_\_

CHECKED (SIGN & DATE) \_\_\_\_\_



# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID. Basin 1

PROJECT NO. 12611010 DATE: 14 / 11 / 2023  
 PROJECT NAME: Aurizon TSF Hexham Monitoring TIME: \_\_\_\_\_  
 CLIENT: Aurizon SAMPLING OFFICER: NF, JMC

COORDINATES/GPS (If Applicable) \_\_\_\_\_  
 SAMPLING METHOD (ie grab, bucket) Grab  
 DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

### ENVIRONMENTAL OBSERVATIONS

WEATHER fine  
 VEGETATION Typha / grasses reeds  
 SLOPE gentle  
 EROSION \_\_\_\_\_  
 OTHER \_\_\_\_\_

### FIELD MEASUREMENTS

TEMPERATURE (°C): 21.8 CONDUCTIVITY (uS/cm): 961  
 pH: 7.8 DO (mg/L): 0.23  
 REDOX (mV): -159.8 Turbidity (NTU) \_\_\_\_\_  
 Sheen, Colour, Odour, clear with brown/yellow tinge, duck weed on  
 Sediment Description surface, no o/s

### HYDROLOGICAL DATA

FLOW MEASUREMENT (or stream height if rating table available) < 1m / min  
 CROSS SECTION WIDTH (m) \_\_\_\_\_  
 DEPTH (m) \_\_\_\_\_  
 OTHER \_\_\_\_\_

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____





# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID Basin 2

PROJECT NO. 12611010 DATE: 14 / 11 / 2023  
 PROJECT NAME: Aurizon TSF Hexham Monitoring TIME: \_\_\_\_\_  
 CLIENT: Aurizon SAMPLING OFFICER: \_\_\_\_\_

COORDINATES/GPS (If Applicable) \_\_\_\_\_  
 SAMPLING METHOD (ie grab, bucket) Grab  
 DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

### ENVIRONMENTAL OBSERVATIONS

WEATHER \_\_\_\_\_  
 VEGETATION \_\_\_\_\_  
 SLOPE \_\_\_\_\_  
 EROSION \_\_\_\_\_  
 OTHER \_\_\_\_\_

### FIELD MEASUREMENTS

TEMPERATURE (°C): \_\_\_\_\_ CONDUCTIVITY (µS/cm): \_\_\_\_\_  
 pH: \_\_\_\_\_ DO (mg/L): \_\_\_\_\_  
 REDOX (mV): \_\_\_\_\_ Turbidity (NTU): \_\_\_\_\_  
 Sheen, Colour, Odour, \_\_\_\_\_  
 Sediment Description \_\_\_\_\_

*Dry no sample*

### HYDROLOGICAL DATA

FLOW MEASUREMENT (or stream height if rating table available) \_\_\_\_\_  
 CROSS SECTION WIDTH (m) \_\_\_\_\_  
 DEPTH (m) \_\_\_\_\_  
 OTHER \_\_\_\_\_

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS



# SURFACE WATER & SEDIMENT SAMPLING RECORD

Location ID... Basin 3

PROJECT NO. 12611010 DATE: 14 / 11 / 2023

PROJECT NAME: Aurizon TSF Hexham Monitoring TIME: \_\_\_\_\_

CLIENT: Aurizon SAMPLING OFFICER: NF, JMC

COORDINATES/GPS (If Applicable) \_\_\_\_\_

SAMPLING METHOD (ie grab, bucket) Grab

DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

## ENVIRONMENTAL OBSERVATIONS

WEATHER \_\_\_\_\_

VEGETATION \_\_\_\_\_

SLOPE \_\_\_\_\_

EROSION \_\_\_\_\_

OTHER \_\_\_\_\_

Dry - no  
sample

## FIELD MEASUREMENTS

TEMPERATURE (°C): \_\_\_\_\_ CONDUCTIVITY (uS/cm): \_\_\_\_\_

pH: \_\_\_\_\_ DO (mg/L): \_\_\_\_\_

REDOX (mV): \_\_\_\_\_ Turbidity (NTU): \_\_\_\_\_

Sheen, Colour, Odour, \_\_\_\_\_

Sediment Description \_\_\_\_\_

\* note to check requirements of the wanes having to have floodgates open or no. currently observed as closed, is this why basin is dry?

## HYDROLOGICAL DATA

FLOW MEASUREMENT (or stream height if rating table available) \_\_\_\_\_

CROSS SECTION WIDTH (m) \_\_\_\_\_

DEPTH (m) \_\_\_\_\_

OTHER \_\_\_\_\_

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS



# SURFACE WATER SAMPLING RECORD

PROJECT NO. 12611010 SURFACE WATER ID Basin 1  
PROJECT NAME Aurizon TSF Hexham Monitoring DATE 13/12/2023  
CLIENT Aurizon TIME 11:30  
SITE Aurizon Hexham LOGGED BY LP  
COORDINATES/GPS (if applicable) N/A  
SAMPLING METHOD (e.g. grab, bucket)  
DETAILED SAMPLE LOCATION DESCRIPTION

## ENVIRONMENTAL OBSERVATIONS

WEATHER HOT, SUNNY  
VEGETATION reeds along Banks  
SLOPE N/A  
EROSION N/A  
OTHER (colour, sheen, odour, turbidity, sediment) Thick algae, Moss and vegetation layer, Algae, Very turbid, Dark Brown to yellow, high H<sub>2</sub>S odour, Bacterial Slime

## FIELD MEASUREMENTS

TEMPERATURE (°C) 23.0  
pH 7.34  
SPC / EC (µS/cm) 1304  
DO (ppm) 0  
REDOX (mV) -280

## HYDROLOGICAL DATA

FLOW MEASUREMENT still  
CROSS SECTION WIDTH (m) 4m  
DEPTH (m) 4m  
OTHER

SAMPLE NO.	NO. CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
Basin 1	8	ICE	-	

FIELD SUPERVISOR

CHECKED (SIGN & DATE)

/ / 2023



# SURFACE WATER SAMPLING RECORD

PROJECT NO. 12611010 SURFACE WATER ID Basin 2  
 PROJECT NAME Aurizon TSF Hexham Monitoring DATE 13/12/2023  
 CLIENT Aurizon TIME 07:30  
 SITE Aurizon Hexham LOGGED BY U

COORDINATES/GPS (if applicable) N/A

SAMPLING METHOD (e.g. grab, bucket)

DETAILED SAMPLE LOCATION DESCRIPTION

## ENVIRONMENTAL OBSERVATIONS

WEATHER  
 VEGETATION  
 SLOPE  
 EROSION  
 OTHER (colour, sheen, odour, turbidity, sediment)

DRY

## FIELD MEASUREMENTS

TEMPERATURE (°C)  
 pH  
 SPC / EC (µS/cm)  
 DO (ppm)  
 REDOX (mV)

## HYDROLOGICAL DATA

FLOW MEASUREMENT  
 CROSS SECTION WIDTH (m)  
 DEPTH (m)  
 OTHER

SAMPLE NO.	NO. CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS

FIELD SUPERVISOR \_\_\_\_\_ CHECKED (SIGN & DATE) \_\_\_\_\_ / / 2023



# SURFACE WATER SAMPLING RECORD

PROJECT NO. 12611010 SURFACE WATER ID 18 Basin 3

PROJECT NAME Aurizon TSF Hexham Monitoring DATE 18/12/2023

CLIENT Aurizon TIME .

SITE Aurizon Hexham LOGGED BY NF

COORDINATES/GPS (if applicable) N/A

SAMPLING METHOD (e.g. grab, bucket) \_\_\_\_\_

DETAILED SAMPLE LOCATION DESCRIPTION \_\_\_\_\_

## ENVIRONMENTAL OBSERVATIONS

WEATHER \_\_\_\_\_

VEGETATION \_\_\_\_\_

SLOPE \_\_\_\_\_

EROSION \_\_\_\_\_

OTHER (colour, sheen, odour, turbidity, sediment) Dry

## FIELD MEASUREMENTS

TEMPERATURE (°C) \_\_\_\_\_

pH \_\_\_\_\_

SPC / EC (µS/cm) \_\_\_\_\_

DO (ppm) \_\_\_\_\_

REDOX (mV) Dry

## HYDROLOGICAL DATA

FLOW MEASUREMENT \_\_\_\_\_

CROSS SECTION WIDTH (m) \_\_\_\_\_

DEPTH (m) \_\_\_\_\_

OTHER \_\_\_\_\_

SAMPLE NO.	NO. CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

FIELD SUPERVISOR \_\_\_\_\_

CHECKED (SIGN & DATE) \_\_\_\_\_

/ / 2023



# Purging and Sampling Record

Bore ID: 101R

Job Information	Sampling Information	Bore Information
Client: Aurizon	Purge Method: MP <b>Peri</b>	SWL(mbTOC): 2.10 m
Project: TSF Hexham Compliance Monitoring	Sample Method: MP <b>Peri</b>	Logic Check: N/A
Proj. No.: 12611010	WQ Meter Type: <del>ProDSS</del> <b>YSI</b>	Screen: From: N/A m
Sampler: <b>LP</b> NF	Flow Cell: Y	NAPL Check: <b>NO</b>
Date: 13/12/2023	Pump Depth: -----	Bore Diam.: 50 mm
Round: Q4	WLevel Meter Type: Dip / Fox / Inl. Fce / Gde	Well Cap Secure? <b>Yes</b>
	Field Filtered? <b>Y/N</b> (filter vessel, disposable filter/syringe)	Ref.datum: TOC
		Bore Depth: 5.43 m
		PID...N/A

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec. Cond (µm/cm)	Dis. Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m TOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate
Stable when (3 consecutive readings)	-	-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable	
07:55	0.5	20.0	6.48	9798	0.15	-97	2.37	No odour, No sediment, Clear, Cloudless
07:58	1.0	20.0	6.50	9741	0.37	-89	2.44	No sheen, Non-turbid
08:01	1.5	20.0	6.51	9577	0.40	-91	2.52	
08:04	2.0	20.1	6.51	9614	0.22	-90	2.58	
08:07	2.5	20.1	6.50	9508	0.15	-90	2.66	
08:10	3.0	20.1	6.49	9450	0.15	-89	2.71	
08:13	3.5	20.1	6.47	9709	0.17	-91	2.77	

Field QA Checks:

Air bubbles in vials? **Y** Any violent reactions? **Y**

Decontamination as per GHD procedure? **Y**

Was sampling equipment pre-cleaned? **Y**

COC updated? **Y**

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.
Preservatives									

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack



# Purging and Sampling Record

Bore ID: MW01R

Job Information	Sampling Information	Bore Information
Client: Aurizon	Purge Method: MP <u>Peri</u>	SWL(mbTOC): <u>1.87</u> m
Project: TSF Hexham Compliance Monitoring	Sample Method: MP <u>Peri</u>	Logic Check: N/A
Proj. No.: 12611010	WQ Meter Type: ProDSS	Screen: From: N/A m
Sampler: LP / <u>NP</u>	Flow Cell: Y	NAPL Check:.....
Date: <u>18/12/2023</u>	Pump Depth: ----	Bore Diam.: 50 mm
Round: Q4	WLevel Meter Type: Dip / Fox / Irt / Fce / Gpe	Well Cap Secure?.....
	Field Filtered? <u>Y/N</u> (filter vessel, <u>disposable filter/s</u> / syringe)	Ref.datum: TOC
		Bore Depth: <u>4.37</u> m
		PID...N/A

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec. Cond (.....)	Dis. Oxygen (.....)	Ox-Red Pt (± mV)	SWL (m TOC)	(.....)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate
Stable when (3 consecutive readings)		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
9:44	0.5	18.2	6.5	2911	0.3	-104.9	2.01		Slightly turbid, dark grey, black sed's, trace H <sub>2</sub> S odour, no sheen
9:46	1.0	18.8	6.5	2685	0.2	-123.9	2.06		
9:48	1.5	18.4	6.5	2448	0.3	-132.0	2.14		
9:50	2.0	19.0	6.5	2245	0.3	-124.2	2.18		
9:52	2.5	19.0	6.5	2165	0.3	-135.7			
									* recharge too slow for peri

Field QA Checks:

Air bubbles in vials? Y/N Any violent reactions? Y/N

Decontamination as per GHD procedure? Y/N

Was sampling equipment pre-cleaned? Y/N

COC updated? Y/N

Parameters:	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.			
Preservatives												

**Comment:** Duplicate samples collected, bottles used, access, condition of headworks etc

**Purge Volumes**  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack



# Purging and Sampling Record

Bore ID: MW02

Job Information		Sampling Information			Bore Information	
Client: Aurizon	Purge Method: MP <u>Peri</u>	SWL(mbTOC): <u>1.94</u> m	Logic Check: N/A			
Project: TSF Hexham Compliance Monitoring	Sample Method: MP <u>Peri</u>	Screen: From: N/A	m	Stick Up: as prev. round		
Proj. No.: 12611010	WQ Meter Type: ProDSS	NAPL Check: .....		Bore Diam.: 50 mm		
Sampler: LP <u>NF</u>	Flow Cell: Y	Ref.datum: TOC		Well Cap Secure? <u>Y</u>		
Date: <u>19/12/2023</u>	Pump Depth: ----	Bore Depth: <u>2.67</u> m		PID...N/A		
Round: Q4	WLevel Meter Type: Dip / Fox / Int Fce / Gge	Field Filtered? <u>Y/N</u> (filter vessel, <u>disposable filter/syringe</u> )				

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (.....)	Dis.Oxygen (.....)	Ox-Red Pt. (± mV)	SWL (m TOC)	(.....)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
10:23	0.5	21.5	5.3	1892	0.8	37.4	1.96		pale brown, slightly turbid, no o/s.
10:25	1.0	20.7	5.3	1998	0.2	39.3	1.96		
10:27	1.5	20.7	5.2	2054	0.2	38.5	"		
10:20	2.0	20.5	5.2	2062	0.2	38.0	"		

Field QA Checks:  
 Air bubbles in vials? Y N Any violent reactions? Y N  
 Decontamination as per GHD procedure? Y N  
 Was sampling equipment pre-cleaned? Y N  
 COC updated? Y N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.				
Preservatives													

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes  
 Casing Int Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack





# Purging and Sampling Record

Bore ID: MW101F

Job Information		Sampling Information		Bore Information	
Client: Aurizon		Purge Method: MP <input checked="" type="radio"/> Peri	SWL(mbTOC): <u>160</u> m	Logic Check: N/A	
Project: TSF Hexham Compliance Monitoring		Sample Method: MP <input checked="" type="radio"/> Peri	Screen: From: N/A m	Stick Up: as prev. round	
Proj. No.: 12611010		WQ Meter Type: ProDSS	NAPL Check:.....	Bore Diam.: 50 mm	
Sampler: LP <input checked="" type="radio"/> NF		Flow Cell: Y	Pump Depth: ----	Ref.datum: TOC	
Date: <del>18/12/23</del> 18/12/23		WLevel Meter Type: Dip / Fox / Int. Fce / Gge	Bore Depth: <u>3.25</u> m	Well Cap Secure?.....	
Round: Q4		Field Filtered? <input checked="" type="radio"/> Y / <input type="radio"/> N (filter vessel, <input checked="" type="radio"/> disposable filter/syringe)			

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec. Cond (.....)	Dis. Oxygen (.....)	Ox-Red Pt. (± mV)	SWL (m TOC)	(.....)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
8:08	0.5	18.6	6.3	26946	0.2	-189.2	1.65		cloudy, white, trace bac
8:10	1.0	18.8	6.4	26965	0.1	-193.9	1.65		Sheen, trace H <sub>2</sub> S odour
8:12	1.5	19.0	6.2	26170	0.1	-176.0	1.65		
8:14	2.0	19.2	6.3	26524	0.1	-171.8	"		
8:16	2.5	19.2	6.3	26298	0.1	-160.7	"		

Field QA Checks:

Air bubbles in vials?  Y /  N Any violent reactions?  Y /  N

Decontamination as per GHD procedure?  Y /  N

Was sampling equipment pre-cleaned?  Y /  N

CDC updated?  Y /  N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.				
Preservatives													

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack



# Purging and Sampling Record

Bore ID: MW106R

Job Information	Sampling Information	Bore Information
Client: Aurizon Project: TSF Hexham Compliance Monitoring Proj. No.: 12611010 Sampler: LP / NF Date: 13/12/2023 Round: Q4	Purge Method: MP <u>Peri</u> Sample Method: MP <u>Peri</u> WQ Meter Type: <del>ProDSS</del> <u>YSI</u> Flow Cell: Y Pump Depth: ----- WLevel Meter Type: <u>Dip / Fox / Int. Fce / Gde</u> Field Filtered? <u>Y / N</u> (filter vessel, <u>disposable filter/syringe</u> )	SWL(mbTOC): <u>1.65</u> m Screen: From: N/A m NAPL Check: <u>NO</u> Ref.datum: TOC Bore Depth: <u>3.36</u> m Logic Check: N/A Stick Up: as prev. round Bore Diam.: 50 mm Well Cap Secure? <u>Yes</u> PID...N/A

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec. Cond (µS/cm)	Dis. Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m TOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate
Stable when (3 consecutive readings)			+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable	
10:00	0.5	20.6	6.59	1003	0.35	-44	1.76	No odour, No sheen, clear colour, Non turbid, trace algae
10:03	1.0	20.7	6.74	787	0.14	-45	1.82	
10:06	1.5	20.7	6.64	760	0.14	-44	1.86	
10:09	2.0	20.5	6.60	751	0.10	-54	1.89	
10:12	2.5	20.4	6.59	754	0.09	-58	1.90	
10:15	3.0	20.3	6.59	758	0.0	-68	1.91	

Field QA Checks:

Air bubbles in vials? Y N Any violent reactions? Y N

Decontamination as per GHD procedure? Y N

Was sampling equipment pre-cleaned? Y N

COC updated? Y N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.				
Preservatives													

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack



# Purging and Sampling Record

Bore ID: MW108R

Job Information	Sampling Information	Bore Information
Client: Aurizon	Purge Method: MP <u>Peri</u>	SWL(mbTOC): <u>242</u> m
Project: TSF Hexham Compliance Monitoring	Sample Method: MP <u>Peri</u>	Screen: From: N/A m
Proj. No.: 12611010	WQ Meter Type: ProDSS	NAPL Check: <u>-</u>
Sampler: LP / <u>NF</u>	Flow Cell: Y	Ref.datum: TOC
Date: <del>13/12/2023</del> <u>18/12/23</u>	Pump Depth: <u>---</u>	Bore Depth: <u>3.99</u> m
Round: Q4	WLevel Meter Type: Dip / Fox / Int.Fce / Gge	Well Cap Secure? <u>✓</u>
	Field Filtered? <u>Y/N</u> (filter vessel, <u>disposable filter/syringe</u> )	PID...N/A

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (.....)	Dis.Oxygen (.....)	Ox-Red Pt. (± mV)	SWL (m TOC) (.....)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate
Stable when (3 consecutive readings):								
			+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable	
8:42	0.5	19.5	6.30	442	0.1	-34.2	/	Turbid, brown, no O/S
8:44	1.0	19.7	6.3	425	0.2	-40.6	//	
8:46	1.5	19.7	6.3	415	0.2	-43.2	//	
8:48	2.0	19.7	6.3	417	0.2	-42.8	-/	
	2.5							

**Field QA Checks:**  
 Air bubbles in vials? Y N Any violent reactions? Y N  
 Decontamination as per GHD procedure? Y N  
 Was sampling equipment pre-cleaned? Y N  
 COC updated? Y N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.				
Preservatives													

**Comment:** Duplicate samples collected, bottles used, access, condition of headworks etc

*Purge Volumes*  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack



# Purging and Sampling Record

Bore ID: MW109

Job Information	Sampling Information	Bore Information
Client: Aurizon Project: TSF Hexham Compliance Monitoring Proj. No.: 12611010 Sampler: <u>LP</u> / NF Date: 13/12/2023 Round: Q4	Purge Method: MP <u>Peri</u> Sample Method: MP <u>Peri</u> WQ Meter Type: <u>ProDSS YSI</u> Flow Cell: Y Pump Depth: ---- WLevel Meter Type: <u>Dip / Fox / In. Fce / Gge</u> Field Filtered? <u>Y</u> / N (filter vessel, <u>disposable filter/syringe</u> )	SWL(mbTOC): <u>2.37</u> m Logic Check: N/A Screen: From: N/A m Stick Up: as prev. round NAPL Check: <u>NO</u> Bore Diam.: 50 mm Ref.datum: TOC Well Cap Secure? <u>NO</u> Bore Depth: <u>3.21</u> m PID...N/A

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec. Cond (µmS/cm)	Dis. Oxygen (% Sat)	Ox-Red Pt. (± mV)	SWL (m TOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable	
12:01	0.5	20.4	6.74	5105	0.23	-198	2.60	Muteak H <sup>2</sup> S odour, Modestly turbid, Brown, trace algae and organics, Mild Bacterial Sheen
12:04	1.0	20.4	6.73	5092	0.21	-203	2.68	
12:07	1.5	20.5	6.73	5090	0.25	-205	2.73	
								Bore low <del>flow</del> depth and high drawdown, sampler <del>was</del> after 3 stable readings (1.5L)

Field QA Checks:

Air bubbles in vials? Y / N Any violent reactions? Y / N  
 Decontamination as per GHD procedure? Y / N  
 Was sampling equipment pre-cleaned? Y / N  
 COC updated? Y / N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.
Preservatives									

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack



# Purging and Sampling Record

Bore ID: MW301R

Job Information	Sampling Information	Bore Information
Client: Aurizon	Purge Method: MP <u>Peri</u>	SWL(mbTOC): <u>0.79</u> m Logic Check: N/A
Project: TSF Hexham Compliance Monitoring	Sample Method: MP <u>Peri</u>	Screen: From: N/A m Stick Up: as prev. round
Proj. No.: 12611010	WQ Meter Type: <u>ProDSS YSI</u>	NAPL Check: <u>NO</u> Bore Diam.: 50 mm
Sampler: <u>LP / NF</u>	Flow Cell: Y Pump Depth: -----	Ref.datum: TOC Well Cap Secure? <u>yes</u>
Date: 13/12/2023	WLevel Meter Type: <u>Dip / Fox / Int. Fee / Gae</u>	Bore Depth: <u>4.92</u> m PID...N/A
Round: Q4	Field Filtered? <u>Y / N</u> (filter vessel, <u>disposable filter/syringe</u> )	

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec. Cond (µS/cm)	Dis. Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m TOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate
Stable when (3 consecutive readings)		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable	
09:10	0.5	18.4	6.72	4525	0.47	-75	1.03	Moderate Sulphur odour, clear, cloudy, not turbid, orange algae within water
09:13	1.0	18.4	6.74	5600	0.11	-127	1.17	
09:16	1.5	18.3	6.71	21600	0.07	-154	1.31	
09:19	2.0	18.3	6.70	20789	0.14	-158	1.31	
09:22	2.5	18.2	6.67	19400	0.08	-158	1.35	
09:25	3.0	18.3	6.65	18328	0.06	-158	1.39	
09:28	3.5	18.3	6.65	19015	0.05	-158	1.44	

Field QA Checks:  
 Air bubbles in vials? Y N Any violent reactions? Y N  
 Decontamination as per GHD procedure? Y N  
 Was sampling equipment pre-cleaned? Y N  
 COC updated? Y N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.
Preservatives									

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

RBOI taken off IP after this sample

Purge Volumes  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack



# Purging and Sampling Record

Bore ID: MW302R

Job Information		Sampling Information			Bore Information	
Client: Aurizon	Purge Method: MP <u>Peri</u>	SWL(mbTOC): <u>1.70</u> m	Logic Check: N/A			
Project: TSF Hexham Compliance Monitoring	Sample Method: MP <u>Peri</u>	Screen: From: N/A	m Stick Up: as prev. round			
Proj. No.: <u>12611010</u>	WQ Meter Type: <u>ProDSS YSI</u>	NAPL Check: <u>NO</u>	Bore Diam.: 50 mm			
Sampler: <u>LP/NF</u>	Flow Cell: Y	Ref.datum: TOC	Well Cap Secure?.....			
Date: 13/12/2023	Pump Depth: ----	Bore Depth: <u>3.98</u> m	PID...N/A			
Round: Q4	WLevel Meter Type: <u>Dip / Fox / Int.Fce / Gge</u>	Field Filtered? <u>Y / N</u> (filter vessel, <u>disposable filter/syringe</u> )				

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Eleg. Cond (µS/cm)	Dis. Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m TOC)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable	
08:30	0.5	18.7	5.86	4445	0.20	-46	1.90	No odour, No sheen, Pale yellow, Moderately turbid. No sediments
08:33	1.0	18.8	5.85	4436	0.18	-48	1.94	
08:36	1.5	19.0	5.83	4429	0.09	-54	1.98	
08:39	2.0	19.2	5.83	4404	0.06	-58	2.00	
08:42	2.5	19.4	5.85	4279	0.12	-61	2.01	
08:45	3.0	19.5	5.87	4159	0.26	-64	2.02	
08:48	3.5	19.6	5.89	4104	0.28	-65	2.02	
08:51	4.0	19.6	5.91	4100	0.30	-66	2.03	

Field QA Checks:		Parameters												
Air bubbles in vials? Y <u>N</u>	Any violent reactions? Y <u>N</u>	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.				
Decontamination as per GHD procedure? Y/N	Was sampling equipment pre-cleaned? Y/N	Preservatives												
COC updated? Y/N														

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc  
TF001 x F002

Purge Volumes  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack



# Purging and Sampling Record

Bore ID: HW 307R

<b>Job Information</b>		<b>Sampling Information</b>			<b>Bore Information</b>		
Client: Aurizon		Purge Method: MP	MP	Peri	SWL(mbTOC): <u>1.91</u>	m	Logic Check: N/A
Project: TSF Hexham Compliance Monitoring		Sample Method: MP	MP	Peri	Screen: From: N/A	m	Stick Up: as prev. round
Proj. No.: 12611010		WQ Meter Type: ProDSS			NAPL Check:.....		Bore Diam.: 50 mm
Sampler: LP / <u>NP</u>		Flow Cell: Y	Pump Depth: ----		Ref.datum: TOC		Well Cap Secure?.....
Date: <u>19/12/2023</u>		WLevel Meter Type: Dip / Fox / Int. Fce / Gge			Bore Depth: <u>5.99</u>	m	PID...N/A
Round: Q4		Field Filtered? <u>Y / N</u> (filter vessel, <u>disposable filter/syringe</u> )					

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec. Cond (.....)	Dis. Oxygen (.....)	Ox-Red Pt. (± mV)	SWL (m TOC)	(.....)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate
Stable when (3 consecutive readings)	-	-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
10:54	0.5	18.6	7.15	34672	0	-209.4	//		-recharge too slow for peri
10:57	1.0	18.7	7.2	34208	-	-203.1			
10:00	1.5	18.6	7.2	33862	-	-205.0	//		
11:04	2.0	18.6	7.2	33118	-	-208.0	//		clear, yellow tinge, no o/s

<b>Field QA Checks:</b>		<b>Parameters</b>												
Air bubbles in vials? <u>Y / N</u>	Any violent reactions? <u>Y / N</u>	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.				
Decontamination as per GHD procedure? <u>Y / N</u>		Preservatives												
Was sampling equipment pre-cleaned? <u>Y / N</u>														
COC updated? <u>Y / N</u>														

**Comment:** Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes		
Casing Int. Dia (mm)	50	100 150
Vol (L/m of casing)	2.0	7.9 17.7
*Double for gravel pack		



# Purging and Sampling Record

Bore ID: M.W.308R

Job Information	Sampling Information	Bore Information
Client: Aurizon Project: TSF Hexham Compliance Monitoring Proj. No.: 12611010 Sampler: LP (NF) Date: 12/12/2023 Round: Q4	Purge Method: MP (Peri) Sample Method: MP (Peri) WQ Meter Type: ProDSS Flow Cell: Y Pump Depth: ----- WLevel Meter Type: Dip / Fox / Ing. Fce / Gge Field Filtered? Y / N (filter vessel, disposable filter/syringe)	SWL(mbTOC): ..... m Logic Check: N/A Screen: From: N/A m Stick Up: as prev. round NAPL Check: ..... Bore Diam.: 50 mm Ref.datum: TOC Well Cap Secure?.....N..... Bore Depth: ..... m PID...N/A

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec. Cond (.....)	Dis. Oxygen (.....)	Ox-Red Pt. (± mV)	SWL (m TOC) (.....)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate
Stable when (3 consecutive readings):			+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable	
9:10	0.5	20.6	6.36	6748	0.2	-150.0		- Frog in well could not collect SWL
	1.0	21.3	6.34	6011	0.2	-172.3		
9:14	1.5	21.7	6.3	5708	0.1	-175.4		
	2.0	21.5	6.3	5840	0.1	-176.3		- moderate H <sub>2</sub> S odour, trace brown <del>sheen</del> algae floc, no sheen, colourless
9:18	2.5	21.1	6.3	6065	0.1	-174.3		

Field QA Checks:

Air bubbles in vials? Y (N) Any violent reactions? Y (N)

Decontamination as per GHD procedure? Y (N)

Was sampling equipment pre-cleaned? Y (N)

COC updated? Y (N)

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.				
Preservatives													

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes  
 Casing Int. Dia (mm) 50 100 150  
 Vol (L/m of casing) 2.0 7.9 17.7  
 \*Double for gravel pack



# **Appendix G**

**Calibration certificates**

Multi Parameter Water Meter

Instrument **YSI Pro DSS**  
 Serial No. **21B104422**



Air-Met Scientific Pty Ltd  
 1300 137 067

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

**Certificate of Calibration**

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

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. COND		2.76ms		396172	2.764ms
2. Temp		22.5°C		MultiTherm	22.9°C
3. pH 4		pH 4.00		399527	pH 4.09
4. pH 7		pH 7.00		388467	pH 7.14
5. ORP mV		234.5mV		393734/393728	225.1mV
6. DO		0.0ppm		391223	-0.02ppm
7. Turbidity		100 NTU		386950	102.6 NTU

Calibrated by: Chris Young

Calibration date: **11/01/2023**

Next calibration due: **10/02/2023**



Instrument **YSI Pro DSS**  
 Serial No. **21B104422**



Air-Met Scientific Pty Ltd  
 1300 137 067

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

### Certificate of Calibration

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

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. COND		2.70ms		389384	2.714ms
2. Temp		24.0°C		MultiTherm	24.8°C
3. pH 4		pH 4.00		388527	pH 3.90
4. pH 7		pH 7.00		388487	pH 6.98
5. ORP mV		231.2mV		395557/395763	230.0mV
6. DO		0.00%		391223	-0.03%
7. Turbidity		100 NTU		396421	102.7NTU

Calibrated by:

Alex Buist

Calibration date:

21/02/2023

Next calibration due:

23/03/2023



Instrument **YSI Pro DSS**  
 Serial No. **21B104422**



Air-Met Scientific Pty Ltd  
 1300 137 067

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

### Certificate of Calibration

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

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. COND		2760ms		385789	2761ms
2. Temp		23.9 °C		MultiTherm	23.5°C
3. pH 4		pH 4.00		394432	pH 3.93
4. pH 7		pH 7.00		393774	pH 6.99
5. ORP mV		230.5mV		395557/395783	231.42mV
6. DO		0.0%		391223	99.5%
7. Turbidity		100 NTU		396421	97.73 NTU

Calibrated by: Kristyan Corrales

Calibration date: **15/03/2023**

Next calibration due: **14/04/2023**



Instrument: **YSI Quatro Pro Plus**  
 Serial No: **18D102941**

Air Met Scientific Pty Ltd  
 1300 137 067

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

### Certificate of Calibration

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

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
2. pH 7.00		pH 7.00		393774	Ph 6.97
3. pH 4.00		pH 4.00		384432	pH 4.18
4. mV		229mV		395557/395763	230.1mV
5. EC		2760mS		385789	2760mS
6. D.O		0.0%		391223	99.9%
7. Temp		25.0 C		MultiTherm	24.4 C

Calibrated by: **KRISTYAN CORRALES**

Calibration date: **14/03/2023**

Next calibration due: **13/04/2023**



**airmet**

AirMet Scientific Pty Ltd  
1300 137 067

Instrument **Interface Meter (60M)**  
Serial No. **312450**

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

### ***Certificate of Calibration***

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

***Calibrated by:***

**Lebelle Chee**

***Calibration date:***

**28/02/2023**

***Next calibration due:***

**29/04/2023**



## Oil / Water Interface Meter



Air-Met Scientific Pty Ltd  
1300 137 067

Instrument: **Interface Meter (60M)**  
Serial No.: **484856**

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

### Certificate of Calibration

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

Calibrated by:

**Kristyan Corrales**

Calibration date: **2/03/2023**

Next calibration due: **1/05/2023**

Instrument **YSI Pro DSS**  
 Serial No. **21K104034**



Air-Met Scientific Pty Ltd  
 1300 137 067

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

### Certificate of Calibration

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

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. EC		2780mS		385789	2773mS
2. Temp		23°C		Testo	23.3°C
3. pH 4		pH 4.00		394432	pH 3.81
4. pH 7		pH 7.00		393774	pH 6.97
5. DO		0.0%		391223	94.30
6. Turbidity		100NTU		396421	100.26 NTU
7. mV		233.4mV		395557/395763	238.4mV

Calibrated by:

**Kristyan Corrales**

Calibration date:

**9/03/2023**

Next calibration due:

**8/04/2023**





Multi Parameter Water Meter

Instrument **YSI Pro DSS**  
 Serial No. **21K104037**



Air-Met Scientific Pty Ltd  
 1300 137 087

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

**Certificate of Calibration**

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

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. E.C		2760uS/cm		396172	2765uS/cm
2. Temp		23.0°C		Instrument temp	23.2°C
3. pH 4		pH 4.00		399527	pH 3.98
4. pH 7		pH 7.00		393774	pH 6.96
5. DO		0.0%		391223	-0.3%
6. Turbidity		100 NTU		396421	100.16 NTU
7. ORP		234.5mV		398884/400204	237.3mV

Calibrated by: **Christopher Young**

Calibration date: **28/04/2023**

Next calibration due: **28/05/2023**

**Multi Parameter Water Meter**

Instrument **YSI Pro DSS**  
 Serial No. **21K101477**



Air-Met Scientific Pty Ltd  
 1300 137 067

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

**Certificate of Calibration**

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

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. pH 7.00		pH 7.00		393774	pH 6.95
2. pH 4.00		pH 4.00		399527	pH 3.91
3. mV		235.1mV		398884/400204	235.2mV
4. EC		2760 mS		396172	2761 mS
5. D.O		0.0%		391223	0.0%
6. Temp		23.0°C		MultiTherm	23.4°C
8. Turbidity		100 NTU		391223	99.3 NTU

Calibrated by: Alex Bulst

Calibration date: **13/04/2023**

Next calibration due: **10/10/2023**

**Multi Parameter Water Meter**

Instrument **YSI Pro DSS**  
 Serial No. **22D105095**



Air-Met Scientific Pty Ltd  
 1300 137 067

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

**Certificate of Calibration**

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

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. pH 7.00		pH 7.00	NIST	399304	pH 6.91
2. pH 4.00		pH 4.00	NIST	399527	pH 4.02
3. ORP		243.08mV	NIST	A393379/B400204	242.5mV
4.SPC		2760uS/cm	NIST	401089	2755uS/cm
6. D.O		0.0%	NIST	12110	-0.3%
7. Temp		18.6°C		MultiTherm	18.6°C
8.Turbidity		100NTU	NIST	396426/402593	100.7NTU

Calibrated by: Jesse Stenroos

Calibration date: **20/06/2023**

Next calibration due: **21/12/2023**

## Multi Parameter Water Meter

Instrument **YSI Pro DSS**  
Serial No. **21K101476**



Air-Met Scientific Pty Ltd  
1300 137 067

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

### Certificate of Calibration

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

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. pH 7.00		pH 7.00	NIST	399304	pH 7.12
2. pH 4.00		pH 4.00	NIST	399527	pH 3.87
3. ORP		241.76mV	NIST	A393379/B400204	241.8mV
4. EC		2760uS	NIST	401089	2761uS
6. D.O		0.0%	NIST	12110	-0.5%
7. Temp		19.2°C	NIST	MultiTherm	19.2°C
8. Turbidity		100NTU	NIST	396426/402593	101.1NTU

Calibrated by: Jesse Stenroos

Calibration date: **20/06/2023**

Next calibration due: **20/07/2023**

## Multi Parameter Water Meter

Instrument **YSI Pro DSS**  
Serial No. **21K101476**



Air-Met Scientific Pty Ltd  
1300 137 067

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

### Certificate of Calibration

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

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. pH 7.00		pH 7.00	NIST	399304	pH 7.18
2. pH 4.00		pH 4.00	NIST	399527	pH 4.01
3. ORP		239.12mV	NIST	A393379/B398193	237.4mV
4. EC		2760uS	NIST	401089	2755uS
6. D.O		0.0%	NIST	399958	-0.2%
7. Temp		20.4°C	NIST	MultiTherm	20.4°C
8. Turbidity		100NTU	NIST	402593	101NTU

Calibrated by: Jesse Stenroos

Calibration date: 04/07/2023

Next calibration due: 03/08/2023

## Multi Parameter Water Meter

Instrument **YSI Pro DSS**  
Serial No. **22D105095**



Air-Met Scientific Pty Ltd  
1300 137 067

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

### Certificate of Calibration

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

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. pH 7.00		pH 7.00	NIST	399304	pH 7.04
2. pH 4.00		pH 4.00	NIST	399527	pH 4.05
3. ORP		236.8 mV	NIST	A393379/B398193	235.7 mV
4. SPC		2760 uS/cm	NIST	401089	2768 uS/cm
6. D.O		0.0%	NIST	399958	0.2%
7. Temp		20.8°C		MultiTherm	20.8°C
8. Turbidity		100NTU	NIST	396426	100.43 NTU

Calibrated by:

Izack Muhlbock

Calibration date:

07/08/2023

Next calibration due:

06/09/2023

**Oil / Water Interface Meter**

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**Instrument**      **Geotech Interface Meter (60M)**  
**Serial No.**      **5339**

Air-Met Scientific Pty Ltd  
1300 137 067

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

**Certificate of Calibration**

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

**Calibrated by:** \_\_\_\_\_ **Guido Camera**

**Calibration date:**                      **15/09/2023**

**Next calibration due:**                      **13/03/2024**

## Multi Parameter Water Meter

Instrument **YSI Pro DSS**  
Serial No. **20F162074**



Air-Met Scientific Pty Ltd  
1300 137 067

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

### Certificate of Calibration

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

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. pH 7.00		pH 7.00	NIST	399304	pH 7.04
2. pH 4.00		pH 4.00	NIST	399527	pH 3.98
3. mV		231.42mV	NIST	A393379/398193	231.5mV
4. EC		2760uS	NIST	401089	2764uS
6. D.O		0%	NIST	399958	-0.5%
7. Temp		23.9°C	NIST		23.9°C
1. Turbidity		100NTU	NIST	402593	100.5NTU

**Calibrated by:** Guido Camera

**Calibration date:** 20/09/2023

**Next calibration due:** 20/10/2023



## Multi Parameter Water Meter

Instrument **YSI Pro DSS**  
Serial No. **21K101474**



Air-Met Scientific Pty Ltd  
1300 137 067

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

### Certificate of Calibration

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

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. EC		2760uS/cm		401089	2761uS/cm
2. Temp		22.5°C		Testo	22.5°C
3. pH 4		pH 4.00		399527	pH 3.93
4. pH 7		pH 7.00		399304	pH 7.07
5. DO		0.0%		12110	0.0%
6. Turbidity		100 NTU		406442	99.6NTU
7. ORP		235.6mV		A405006/B398193	235.4mV

**Calibrated by:** Guido Camera

**Calibration date:** **20/09/2023**

**Next calibration due:** **20/10/2023**



Air-Met Scientific Pty Ltd  
1300 137 067

## Oil / Water Interface Meter

Instrument **Geotech Interface Meter (30M)**  
Serial No. **4063**

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

### Certificate of Calibration

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

**Calibrated by:** \_\_\_\_\_ **Guido Camera**

**Calibration date:** **15/09/2023**

**Next calibration due:** **14/11/2023**

## Multi Parameter Water Meter

Instrument **YSI Pro DSS**  
Serial No. **21K101474**



Air-Met Scientific Pty Ltd  
1300 137 067

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

### Certificate of Calibration

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

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. EC		2760uS/cm		401089	2761uS/cm
2. Temp		22.5°C		Testo	22.5°C
3. pH 4		pH 4.00		399527	pH 3.93
4. pH 7		pH 7.00		399304	pH 7.07
5. DO		0.0%		12110	0.0%
6. Turbidity		100 NTU		406442	99.6NTU
7. ORP		235.6mV		A405006/B398193	235.4mV

**Calibrated by:** Guido Camera

**Calibration date:** **20/09/2023**

**Next calibration due:** **20/10/2023**

**Multi Parameter Water Meter**

Instrument Serial No. YSI Quatro Pro Plus  
18D102941



Air-Met Scientific Pty Ltd  
1300 137 067

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
Switch/keypad	Operation	✓	
	Display	Intensity	✓
Grill Filter	Operation (segments)	✓	
	Condition	✓	
PCB	Seal	✓	
	Condition	✓	
Connectors	Condition	✓	
	Sensor	Condition	✓
Sensor	1. pH	✓	
	2. mV	✓	
	3. EC	✓	
	4. D.O	✓	
	5. Temp	✓	
Alarm	Beeper		
	Settings		
Software	Version		
Data logger	Operation		
Download	Operation		
Other tests:			

**Certificate of Calibration**

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

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
2. pH 7.00		pH 7.00		406263	pH 7.01
3. pH 4.00		pH 4.00		405966	pH 4.03
4. mV		234.5 mV		A405006/B398193	234.3 mV
5. EC		2760 mS		406852	2761 mS
6. D.O		0.0%		12111	-0.1%
7. Temp		22.5°C		MultiTherm	22.5°C

Calibrated by: Samuel Tanner

Calibration date: 8/11/2023

Next calibration due: 8/12/2023

## Multi Parameter Water Meter



Air-Met Scientific Pty Ltd  
1300 137 067

Instrument YSI Quatro Pro Plus  
Serial No. 11C100763

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

### Certificate of Calibration

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

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. pH 7.00		pH 7.00		406263	pH 6.99
2. pH 4.00		pH 4.00		405966	pH 3.99
3. mV		238.9 mV		A405006/B398193	239.1 mV
4. EC		2760 mS		401089	2764 mV
5. D.O		0.0%		12111	0.0%
6. Temp		20.5°C		MultiTherm	20.5°C

Calibrated by: \_\_\_\_\_ Sara Angelini

Calibration date: 5/12/2023

Next calibration due: 4/01/2024

**Oil / Water Interface Meter**

Instrument      **Geotech Interface Meter (60m)**  
 Serial No.      **3961**



**Air-Met Scientific Pty Ltd**  
 1300 137 067

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

**Certificate of Calibration**

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

**Calibrated by:** \_\_\_\_\_ **Samuel Tanner**

**Calibration date:**                      04-Dec-23

**Next calibration due:**                 02-Feb-24

# Appendix H

Photo log

**Photograph 1:** Basin 1



**Photograph 2:** Basin 2



**Photograph 3:** Basin 3





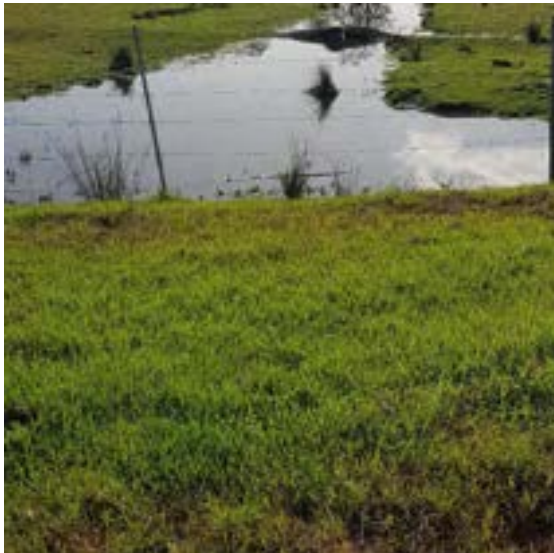
**Photograph 1:** SW1



**Photograph 2:** SW2



**Photograph 3:** SW3



**Photograph 4:** SW4



**Photograph 5:** SW4A



**Photograph 6:** SW5



**Photograph 7:** SW6



**Photograph 8:** SW7



**Photograph 9:** SW8



**Photograph 10:** SW9



**Photograph 11:** SW10



**Photograph 12:** SW11



**Photograph 13:** Basin 1



**Photograph 14:** Basin 2



**Photograph 15:** Basin 3



**Photograph 1:** Basin 1



**Photograph 2:** Basin 2



**Photograph 3:** Basin 3



**Photograph 1:** MW01R



**Photograph 2:** MW101R



**Photograph 3:** 101R



**Photograph 4:** MW02



**Photograph 5:** MW106R



**Photograph 6:** MW108R



**Photograph 7:** MW109



**Photograph 8:** MW301R



**Photograph 9:** MW302R



**Photograph 10:** MW307R



**Photograph 11:** MW308R



**Photograph 12:** Basin 1



**Photograph 13:** Basin 2



**Photograph 14:** Basin 3



**Photograph 1:** Basin 1



**Photograph 2:** Basin 2



**Photograph 3:** Basin 3





**Photograph 1:** Basin 1



**Photograph 2:** Basin 2



**Photograph 3:** Basin 3



**Photograph 1:** MW01R



**Photograph 2:** MW101R



**Photograph 3:** 101R



**Photograph 4:** MW02



**Photograph 5:** MW106R



**Photograph 6:** MW108R



**Photograph 7:** MW109



**Photograph 8:** MW301R



**Photograph 9:** MW302R



**Photograph 10:** MW307R



**Photograph 11:** MW308R



**Photograph 12:** Basin 1



**Photograph 13:** Basin 2



**Photograph 14:** Basin 3



**Photograph 1:** Basin 1



**Photograph 2:** Basin 2



**Photograph 3:** Basin 3



**Photograph 1:** Basin 1



**Photograph 2:** Basin 2



**Photograph 3:** Basin 3



**Photograph 1:** MW01R



**Photograph 2:** MW101R



**Photograph 3:** 101R



**Photograph 4:** MW02



**Photograph 5:** MW106R



**Photograph 6:** MW108R



**Photograph 7:** MW109



**Photograph 8:** MW301R



**Photograph 9:** MW302R



**Photograph 10:** MW307R



**Photograph 11:** MW308R



**Photograph 12:** Basin 1





**Photograph 13:** Basin 2



**Photograph 14:** Basin 3



**Photograph 1:** Basin 1



**Photograph 2:** Basin 2



**Photograph 3:** Basin 3



**Photograph 1:** Basin 1



**Photograph 2:** Basin 2



**Photograph 3:** Basin 3



**Photograph 1:** MW01R



**Photograph 2:** MW101R



**Photograph 3:** 101R



**Photograph 4:** MW02



**Photograph 5:** MW106R



**Photograph 6:** MW108R



**Photograph 7:** MW109



**Photograph 8:** MW301R



**Photograph 9:** MW302R



**Photograph 10:** MW307R



**Photograph 11:** MW308R



**Photograph 12:** Basin 1



**Photograph 13:** Basin 2



**Photograph 14:** Basin 3





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## APPENDIX D – Compliance Report Declaration Form



## Project Information

Project Name:	Hexham Train Support Facility
Project Application Number:	State Significant Infrastructure MP07_0171 (SSI 6090) MOD 2
Description of Project:	Operational Train Support Facility
Project Address:	Off Anderson Drive, Hexham, NSW, 2322
Proponent:	Aurizon Holdings Ltd.
Title of Compliance Report:	Hexham Train Support Facility: Operational Compliance Report (2023)
Date:	15/03/2024

I declare that I have reviewed relevant evidence and prepared the contents of the attached Compliance Report and to the best of my knowledge:


- the Compliance Report has been prepared in accordance with all relevant conditions of consent;
- the Compliance Report has been prepared in accordance with the Compliance Reporting Post Approval Requirements;
- the findings of the Compliance Report are reported truthfully, accurately and completely;
- due diligence and professional judgement have been exercised in preparing the Compliance Report; and
- the Compliance Report is an accurate summary of the compliance status of the development.

Notes:

- Under section 10.6 of the Environmental Planning and Assessment Act 1979 a person must not include false or misleading information (or provide information for inclusion in) a report of monitoring data or an audit report produced to the Minister in connection with an audit if the person knows that the information is false or misleading in a material respect. The proponent of an approved project must not fail to include information in (or provide information for inclusion in) a report of monitoring data or an audit report produced to the Minister in connection with an audit if the person knows that the information is materially relevant to the monitoring or audit. The maximum penalty is, in the case of a corporation, \$1 million and for an individual, \$250,000; and

The Crimes Act 1900 contains other offences relating to false and misleading information: section 307B (giving false or misleading information – maximum penalty 2 years' imprisonment or 200 penalty units, or both).

## Deceleration

Name of Authorized Reporting Officer:	Harry Egan
Title:	Principal Adviser Environment
Signature:	
Qualification:	Bachelor of Environmental Science and Management
Company:	Aurizon Holdings Limited
Company Address:	900 Ann Street, Fortitude Valley QLD, Australia 4006